

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

**INNOVATION OF THE NAVAL POSTGRADUATE
SCHOOL'S STUDENT THESIS RESEARCH PROCESS
THROUGH KNOWLEDGE MANAGEMENT**

by

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September 2000

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RESEARCH PROCESS THROUGH KNOWLEDGE MANAGEMENT**

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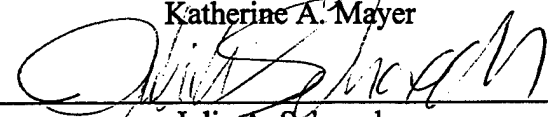
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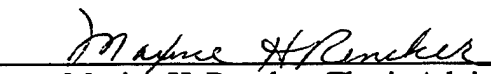
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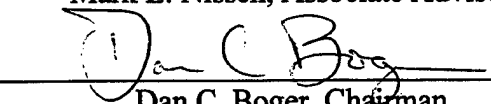
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ABSTRACT

This thesis examines the student thesis research process at Naval Postgraduate School (NPS), Monterey, CA. Research in the academic environment by Leavitt (1965), Davenport (1993), and Nissen (1998), makes a case for the integration of information technology (IT) with the process it supports. This thesis examines how the NPS population discovers and shares knowledge in the thesis research process. Additionally, it analyzes how a knowledge management (KM) tool such as a knowledge portal might improve the thesis research process. This thesis explores the culture of knowledge sharing and knowledge hoarding in the academic environment of NPS. This thesis also investigates the relevancy of student theses to Navy needs and how this relevancy might be enhanced through a knowledge portal (KP).

The findings indicate that the student thesis process at NPS can be innovated through a KM tool such as a KP. Development and implementation of the KP must be executed using an iterative, integrated approach through gradual addition of resources, functionality, and user groups. Weaknesses identified in the current thesis process require reengineering efforts. Finally, the differences in the academic and military cultures at NPS must be minimized for successful innovation to occur.

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I. INTRODUCTION

A. BACKGROUND

This thesis examines the student thesis research process at Naval Postgraduate School (NPS), Monterey, CA. Research in the academic environment by Leavitt (1965), Davenport (1993), and Nissen (1998), makes a case for the integration of information technology (IT) with the process it supports. This theory is utilized to explore the student thesis research process at NPS. It draws from a recent framework put forth by Nissen, Kamel, and Sengupta (2000) that knowledge management (KM) and system design must be examined from the integrated perspectives of innovative process reengineering, expert systems, and knowledge representation. This thesis examines how the NPS population discovers and shares knowledge in the thesis research process. Additionally, it analyzes how a KM tool such as a knowledge portal might improve the thesis research process. The thesis also explores the culture of knowledge sharing and knowledge hoarding in the academic environment of NPS. Finally, it investigates the relevancy of student theses to Navy needs and how this relevancy might be enhanced through a knowledge portal (KP).

B. PURPOSE

The purpose of this thesis is to evaluate the student thesis research process at NPS and to determine if it can be innovated through the utilization of a KM tool such as a knowledge portal. This research utilizes an integrated approach; it examines the NPS

organization, the knowledge needs of the student and faculty population, the student thesis research process, and the sharing or hoarding of knowledge in the NPS culture.

The NPS Dudley Knox Library is working on a parallel project with the Department of the Navy Chief Information Office (DON-CIO) to introduce the concept of KM integration for the management and sharing of information assets within NPS and other naval commands. Assisting NPS and DON-CIO is a systems integrator, Logistics Management Institute (LMI). The project entails the use of a commercial software product that facilitates the organization of command information and resident knowledge via a single focal point. This tool is called a knowledge portal.

This thesis specifically examines the resident knowledge as it pertains to the thesis research process at NPS and how KM tools and techniques can innovate this process. The importance of this research is two-fold: 1) thorough user requirements and processes must be examined to ensure maximum effectiveness and utilization of the KP throughout the student thesis process, and 2) there is a percentage of NPS students who are unable to complete their thesis prior to graduation, therefore requiring thesis extensions. Innovation of the thesis research process through KM techniques may enable the number of students graduating with a completed, military- relevant thesis to increase.

Student thesis research at NPS is a process well suited for applying KM innovation because of the large amount of tacit knowledge (e.g., the personal knowledge that exists in an individual's mind) residing with experienced researchers that needs to be shared. This tacit knowledge needs to be transferred to the graduate student in order to

conduct more accurate and thorough research. A tool such as a KP can apply KM innovation by capturing the tacit knowledge of faculty and students to meet current and future needs. Additionally, it can facilitate sharing knowledge in such areas as the research process itself, potential thesis advisor areas of expertise, and on-going NPS research. Finally, a KM tool can effectively capture and transfer knowledge to ensure expertise is shared and duplicate research is reduced.

The underlying theory on which this research is being conducted is the premise that IT must be integrated with the knowledge it supports. Using the Nissen et al (2000) framework, this thesis takes an integrated approach and examines the organization, the people, the processes, and the culture in which NPS operates. The framework includes the investigation of: 1) the analysis and design of the current student thesis research process, 2) knowledge discovery and sharing within the process of interest and 3) KM system design and implementation. Examination of this final area is limited due to the timeline involved. Using this framework, we assess the student thesis research process and provide recommendations for innovation.

C. SCOPE AND METHODOLOGY

1. Scope

The scope of the thesis is primarily limited to the following:

- Examining KM concepts and definitions.
- Examining potential reengineering methods.

- Defining the information and knowledge requirements of the students and faculty at NPS through a user requirements assessment, particularly the thesis research requirements.
- Assessing the current thesis research process at NPS through qualitative data analysis.
- Examining the corporate culture of NPS and the subcultures and players that are part of the NPS thesis process organization.
- Identifying the internal sources of information held in NPS databases, either on the NPS campus or to which NPS has licensed access, which are available to meet the above identified needs.
- Developing a Concept of Operations (CONOPS) for the KP utilizing the identified databases and resources.
- Anticipating the impact of the KP or other KM tools on the innovation of NPS processes.

2. Methodology

The methodology used in this research consists of the following steps:

- Conduct a literature search of books, magazine articles, World Wide Web, and other information resources regarding the KM concepts and tools available to be used to affect innovation in the NPS thesis research process.
- Through assistance from a systems integrator and NPS staff, develop and administer a user requirements assessment to the NPS community through:
 - Interviews with the key stakeholders at NPS.
 - Focus group discussions with NPS faculty and students.
- Identify internal databases and those external resources accessible by NPS that are available to meet the identified user needs.
- Analyze the data collected in the following manner:
 - Methodology – qualitative data analysis.
 - Techniques – interviews and focus group discussions.
 - Tools – a software product (NVivo) that is geared toward analyzing non-numerical, unstructured data through exploring emerging themes and discovering and testing patterns.

- Incorporate findings into CONOPS.

D. ORGANIZATION OF STUDY

In the first step of our research we define KM and determine the theories that drive the direction of this thesis. It is apparent that there are numerous definitions of knowledge management as well as KPs. Though data differs from information just as much as information differs from knowledge, often times the terms data and information management and knowledge management are used interchangeably. The same phenomenon occurs with web pages that are called knowledge portals when they merely structure the information of a particular organization. Chapter II of this thesis attempts to decipher the use of these terms and lay the foundation for this study in KM. It also defines the process of reengineering and the theory of culture as it applies to KM.

In order to determine the customer needs for a KP, we conduct a series of surveys on potential users at NPS. Interviews are conducted with those individuals determined to be stakeholders. Focus groups, with up to ten participants, are held to gather user requirements and identify their concerns with information and knowledge management. Chapter III outlines the specifics of the interview process and displays the information and knowledge resources determined to be most valuable to the NPS population.

Although reengineering methods are examined, process innovation does not necessarily require a comprehensive reengineering effort. In Chapter IV we examine the current thesis process and present the findings of our qualitative analysis. We analyze

how the thesis process can be innovated using KM principles and assess the knowledge sharing culture of NPS and how this may impact the innovation. We determine the criticality of the issues regarding thesis process innovation and the potential requirements for process reengineering. Finally, we discuss the relevancy of student theses to Navy needs.

Chapter V of this thesis outlines the operational concept of the NPS Knowledge Portal and how it might interact with and assist the student thesis process. This chapter also discusses any change management issues that must be considered to facilitate the successful innovation of the thesis process. The final chapter wraps things up with conclusions and provides recommendations on how the results of this study may be applied to other knowledge-intensive processes.

E. RESEARCH QUESTIONS

1. Primary Research Question

How can the student thesis research process at NPS be innovated using KM processes, techniques, and tools?

2. Secondary Research Questions

- What is the current thesis research process?
- How is knowledge discovered and shared in the thesis research process?
- What strengths and weaknesses are associated with the current thesis process?
- Are the weaknesses severe enough to warrant reengineering of the thesis research process?
- How can the process be innovated to improve performance?

- What risks, impediments, or limitations must be addressed for process innovation to succeed?
- Are the current thesis research topics relevant to Navy or military needs? If not, how might this be improved so that they become more relevant?
- How can the thesis process results of this study be applied to other knowledge-intensive processes and institutions?

II. KNOWLEDGE MANAGEMENT

A. RATIONALE FOR KNOWLEDGE MANAGEMENT

In the late 1950s, the world moved from the Industrial Age to the Information Age (MN 4125, 2000). By 1960, information replaced raw materials and new microchip technology gave way to powerful computing power never before realized. Technology continued to advance in the 80s as the Internet allowed terrestrial boundaries and time differences to be conquered with ease. Today, the world communicates by a click of a mouse and a modem connection. We are leaving behind the Information Age and entering the realm of what author David Watson and others call the Knowledge Age (Watson, 1999).

Knowledge is becoming vital to all organizations, whether that organization is small or a Fortune 500 company. The amount of capital, formerly the basis for company wealth, has been replaced by the amount of knowledge and the company's ability to retain and transfer this knowledge across the organization (IS 4182, 2000). KM can cover a broad spectrum of information and knowledge elements that range from "informal chats among employees about what works and what doesn't, to formal reports about lessons learned from past activities" (Kelman, 2000). These elements are not new; they have been used in management circles for decades. What is new is the importance placed on the creation, synthesis, and sharing of information and individuals' insights or comprehension of information (Kelman, 2000). This is the science of KM.

This chapter lays the foundation for a study in KM. It is important to explain how KM came about and to define terms that are used throughout this study. The primary focus of this thesis is to determine how a KM tool could innovate the student thesis research process. The theories of KM life cycle models and process reengineering are explored to support this primary focus. Finally, the idea of organizational culture and its impact on innovation is introduced as an essential element of this study.

B. WHAT IS KM?

It is not enough to just manage information. We must now manage knowledge as it gives those that own it competitive advantage (Davenport and Prusak, 1998). In today's management literature, knowledge is defined as different from information, just as information differs from plain data. Data can be defined as "a set of discrete objective facts about events". It is the lowest level of known facts that are without context or meaning (Davenport and Prusak, 1998).

Information is organized data or "data with impact and meaning" (IS 4185, 1999). It is presented in context and organized so that it can be transferred from person to person. An example of information would be this thesis. It should give the reader new insight and shape the reader's perception of KM, the academic environment, and innovation tools. Information is more manageable and less complex than knowledge (Devlin, 1999).

PROJECT DESCRIPTION AND BACKGROUND

- **What is knowledge?** There are many definitions of knowledge. For the purposes of this project, knowledge is the comprehension of information with the discovery of something that was not known before. Knowledge may take two forms: explicit or implicit (tacit). Explicit knowledge is codified knowledge that is transferred through education, formulae, theories, patents, manuals, and books. Tacit knowledge is personal knowledge based on skills/know-how, experience, intelligence, and attitude. (Watson, 1999)
- **What is knowledge management (KM)?** KM is an emerging discipline that stresses a formalized, integrated approach to managing an enterprise's tangible and intangible information assets. Knowledge management is a coordinated attempt to tap the unrealized potential for sharing and reuse what lies in an enterprise's collective consciousness (Gartner Group, 1999).
- **What is a knowledge portal (KP)?** A KP is a place to visit when you seek knowledge about specific subjects. It is a place of centralized information with centralized links to information. A KP is goal-directed towards knowledge acquisition, knowledge transmission, and knowledge management. It is a system for knowledge discovery, capture, dissemination, and sharing among communities of interest. (Firestone, 1999)
- **What are the goals of the NPS KP?** The NPS KP will be a focused point of access to Web-based resources and services in information management/IT, business, and naval affairs. It will provide integrated searching and retrieval of NPS internal information resources (email, policies and directives, etc) as well as external information from newspapers, periodicals, and databases. It will support information research requirements. It will provide collaboration tools (people and expertise locators, librarian advisory service, etc).

Figure 2.1 KM and KP Definition Sheet

There is no clearly defined, agreed upon definition of knowledge. It varies, as does the definition of KM. Webster's dictionary defines knowledge as "an organized body of information or a comprehension consequent on having acquired and organized a

body of facts." Figure 2.1 shows the various definitions that the authors of this thesis use to introduce KM and KPs to the NPS population during user surveys. Stated in simple terms, knowledge is information comprehended and processed by the human brain. Knowledge is very individualistic. Watson states that the comprehension and analysis of knowledge is dependent on the experience, skill, attitude, and intellectual ability of the individual (1999). What one person perceives as information, may in fact be knowledge to another. This is where the complexity of knowledge lies, as everyone processes information differently. "The difference is even greater between people of different age groups, backgrounds, or levels of mental capacity" (Watson, 1999). Knowledge can be said to be a combination of the information a person receives, their previous personal experiences, and the context in which those experiences are received (Harris, 1996).

We now turn our attention from the definition of knowledge to the definition of KM. Again, there is no clear 'recipe' regarding the proper way to manage knowledge. Knowledge is highly complex and is not evenly transferable (Watson, 1999). It can take at least two forms: that which is explicit and knowledge that is implicit or tacit. Explicit knowledge is codified and can easily be transferred via documents, formulae, multimedia, and other modes. An example of explicit knowledge would be a bike mechanic's capability to fix a bike chain. This knowledge could be transferred to a novice mechanic by use of part numbers, bike model diagrams, and a step-by-step procedure.

Tacit knowledge is much harder to capture. It is the intuition, hunches, experience, or "know-how" of an individual. Tacit knowledge resides in the mind of the

individual. An example of a mechanic's tacit knowledge would be her diagnostic ability to look at a bike's gearbox and immediately know what is broken. This diagnostic knowledge is much more difficult to transfer to the novice and more than likely to be discovered and formalized only through years of experience.

The mere existence of knowledge does not create value for an organization. KM is an emerging discipline that stresses a formalized, integrated approach to managing an enterprise's tangible and intangible information assets. In addition, it is a coordinated attempt to tap the unrealized potential for sharing and reuse that lies in an enterprise's collective consciousness (Gartner Group, 1999). Knowledge management tries to capture the tacit and explicit knowledge of individuals and distribute that knowledge across the organization. KM attempts to create knowledge repositories and improve access to them as well as enhance the knowledge environment and manage knowledge as a corporate asset. This is a daunting task. Organizations are "struggling to gain a better understanding of what they know, what they need to know, and what to do about it" (Davenport and Prusak, 1998). KM has potential to assist them in this endeavor.

C. KNOWLEDGE MANAGEMENT LIFE CYCLE MODELS

By the mid 1980's, the meshing of new technology with organizational design, process strategy, and external relationships was already recognized to be one of the most important issues of organizational innovation (Pennings and Buttendam, 1987). At the time, this integration of information technology into an organization was a new concept.

KM was just beginning to be defined. Almost 20 years later, Pennings' and Buttendam's theory of IT integration still holds true and has been further studied as an element of KM. Research shows that process design must be integrated with system design (Nissen et al, 2000). An organization will be successful only if it conducts an analysis of the processes, identifying the practices within the organization that inhibit or promote knowledge creation or transfer, and implements the IT that supports the management of the organization's knowledge.

Organizational knowledge therefore must be managed through its life cycle. Life cycle management is a methodology that answers the common questions of who, what, where, when, and why. The methodology used to study the NPS student thesis research process is the Amalgamated KM Life Cycle Model as developed by Nissen et al (2000). This Model is depicted in Figure 2.2. It integrates the important concepts and terms from four other life cycle models developed by KM researchers.

The Model is a circle split into two halves. Life cycle management is found to be an iterative process that can be better symbolized by a circle as opposed to having the steps laid out sequentially. One half of the cycle is represented by supportive or sharing actions that support people. These are called Class I activities. The left hand of the circle depicts expanded KM systems that are performative in nature. These systems are called Class II and include activities performed in conjunction with or in lieu of people in the organization.

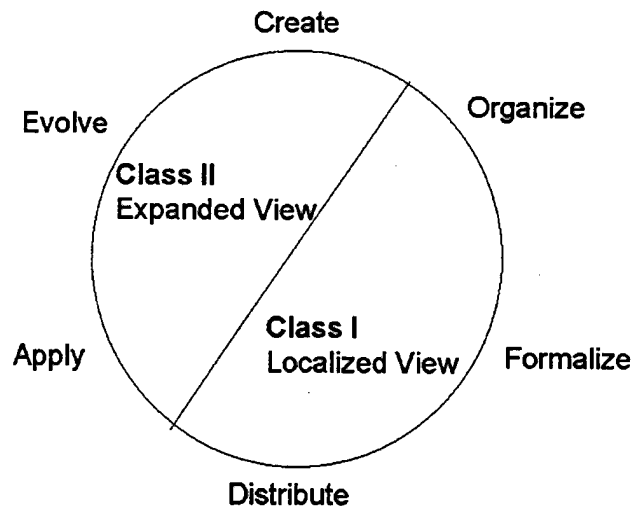


Figure 2.2 KM Life Cycle [from Nissen et al, 2000]

We now examine the individual activities of the Amalgamated Model. The organization's ability to generate or create knowledge often directly corresponds to achieving business success (Davenport and Prusak, 1998). *Create* refers to how an organization comes up with knowledge. It involves the discovery and development of new knowledge. Few existing single systems support knowledge creation. Examples would be those systems capable of data mining and artificial intelligence. There are some organizational or enterprise practices such as Research and Development and benchmarking that are employed to support knowledge creation (Nissen et al, 2000).

The second activity of the model pertains to the organization, bundling or mapping of knowledge. In order to complete the *organize* activity, the staff must decide

what knowledge is important, determine how to store it, and develop explicit methods to retrieve it. The organized knowledge is only valuable if all employees in the organization can find and utilize it. Otherwise, the organization possesses useless information or data that is merely tying up resources and space. Keyword searches can assist in retrieving the knowledge. Knowledge can be organized via documents, manuals, and presentations using multimedia such as videos, email, and web sites with sound. Although it is contained and organized, not all members of the organization can access and utilize it equally. An example would be if a business put all of its Human Resources (HR) procedures on its homepage. If an employee is not web savvy or his computer is down, then that employee would rather walk down to HR and ask someone about an issue.

Organizational-wide utilization of knowledge is achieved more readily via the next two Class I activities: *formalize* and *distribute*. Instead of forcing the members of the organization to "pull" the knowledge, it is often better to develop ways to formulate the knowledge and distribute it to the organization. Expert systems give organizations a method to formulate as well as distribute knowledge. Other distribution systems include groupware, list-servers, and group meetings such as workshops, teleconferences, and formal and informal discussion groups. The World Wide Web has made distribution much faster and cheaper, especially for explicit knowledge. The organization's tacit knowledge is still difficult to tap. However, it can be distributed through such mentoring activities as on-the-job training programs, team building exercises, informal chats, and other types of liaisons.

The application activity of an organization includes the use of knowledge to make a decision or perform a cognitive task. The challenge for organizations is that the application of knowledge can only happen if the person can interpret the knowledge, *apply* it to his or her experiences, and learn from it. As the organization applies knowledge and makes a decision, the organizational knowledge can then *evolve*. Despres and Chauvel (1999) define this sixth element of the Model as "the refinement and continued development of existing knowledge." As knowledge evolves within an organization it can spawn and create new knowledge thus returning to the beginning of this iterative KM life cycle process.

D. PROCESS REENGINEERING

Literature shows that the wave of business process reengineering (BPR) in the early 90s was popular, but not necessarily successful (Nissen et al, 2000). BPR was introduced in two articles (Davenport and Short, 1990) and (Hammer, 1990). A common objective of reengineering efforts is to change the process with an eye on improved performance. This is accomplished by compiling the "best practices" (Davenport and Prusak, 1998) or more effective ways to perform a process or sub-process inside or outside a company. Often these best practices can be stored in an electronic repository for sharing across the organization and thus become managed knowledge.

Davenport and Prusak (1998) warn against putting too much emphasis on best practices knowledge, the product of reengineering. Best practices KM deals with

processes that are easy to identify and document, as they are explicit. Best practices are not the only knowledge within the organization that is worth capturing and sharing. The authors state that there are many more types of knowledge that can be shared, such as customer and technical knowledge. In addition, although the organization's tacit knowledge is harder to tap, tacit knowledge is essential and incorporating it into the organizational knowledge base may require more complex KM initiatives. Examples of such complex initiatives may include expertise locators and collaboration, frequently asked questions (FAQs), KPs, and on-line peer troubleshooting.

BPR should not be confused with process innovation, although the two are related. BPR may utilize innovation to secure and disseminate the organization's best practices. Process innovation combines the adoption of a process view of a business with the application of innovation (Davenport, 1993). Where BPR is the science of applying methodologies to achieve a new design, it is only part of what is necessary for radical change. Process innovation encompasses the vision of new work strategies, the actual reengineering activity, and the implementation of change including all of the complex interactions of technological, human, and organizational elements (Davenport, 1993).

E. KNOWLEDGE-FRIENDLY CULTURE

A comprehensive discussion on KM needs to mention the impact of the corporate culture on the organization's KM efforts. Culture can be defined as a system of norms, assumptions, and behaviors developed over time by an organization's members and is

conveyed by the words people use, the stories they tell, and the activities that are valued (Bancroft, 1992). Culture, like knowledge, is deeply personal as it is based on an individual's feelings and experiences rather than any formal policy. "Although there may be a prevalent corporate culture for a given organization, the way in which employees express and interpret it will vary tremendously," (Bancroft, 1992).

The biggest challenges for successful KM are cultural, not technological (Kelman, 2000). Success often hinges on having or building a corporate culture that supports and encourages knowledge collaboration. However, if a knowledge-friendly culture does not already exist, it is very difficult to create. Additionally, given the downsizing environment in which we live, there may be little desire or incentive to share knowledge. People may be guarded with their tacit knowledge, believing it to be their ticket to secure employment. After all, if knowledge is power, then why share it (Watson, 1999)?

III. USER REQUIREMENTS

A. INTRODUCTION

Leavitt (1965), Davenport (1993), and others state that during the integration of new IT with a process, other key factors such as the organization, procedures, people, and culture must also be examined. Interviewing is a typical technique used in the development of information and KM systems. Interviews allow system designers to interface with the users of the current process and investigate procedures, culture, and working climate. In return, better and more useful systems can be designed. For the NPS KP project, several types of interviews are conducted. These interviews are tailored to the varied demographics at NPS so that requirements can be captured from the entire organization. The presentation at Appendix A introduces the NPS KP project concepts to all of the interviewees. This chapter discusses the stakeholder interviews and the three types of focus groups: faculty, staff, and student. These interviews identify important NPS resources and databases that can be used with the KP project. This chapter also introduces the concept of KPs and how this technology can be used to innovate the thesis process.

B. STAKEHOLDER INTERVIEWS

Stakeholders are identified as those individuals who have a personal stake in the information and knowledge resources at NPS. The majority of the stakeholders are senior

civilian and military officers who manage departments, staff codes, or organizations onboard the NPS. The NPS Library Director identifies the original list of stakeholders. A comprehensive list of stakeholders can be found at Appendix B. The hour-long interview is conducted with the questions found at Appendix C under the title Interview Guide - NPS Stakeholders. The interviews are conducted in the stakeholder's individual office or conference room, with a two to three member interview team taking notes. The interview team consists of a member from LMI, the authors of this thesis, and the Director of the NPS Library. The interviews are taped with an audio-recorder and are later transcribed by a court reporter to a text document.

The stakeholders have a myriad of information and knowledge needs. They are more than likely involved in several committees and projects outside of their job scope. Stakeholders have a solid understanding of NPS core business processes and the importance of knowledge transfer. The NPS stakeholders identify specific information and knowledge resources that differ in part from those identified by the focus groups. Some of the stakeholders are intimately involved in the thesis research process and offer input on the research questions.

C. FOCUS GROUPS

Focus groups are designed to represent the varied population at NPS. Groups of approximately ten individuals within the same peer group are selected through varied methods including email, personal invitation, and selection by supervisors. Separation by

peer group is an important factor so that no one individual will feel reluctant to speak in front of a more senior individual. A total of fourteen focus groups are conducted by two person teams from the NPS Library staff, LMI, and writers of this thesis. The questions are tailored for the specific focus groups as they attempt to determine what information, data, and knowledge resources are useful and essential to the NPS population. The specific focus group questionnaires can be found at Appendix D. There are three different types of focus groups.

1. NPS Faculty

The NPS faculty is invited by email. To fill these sessions, the Library Director personally contacts additional faculty. They represent various curricula and tenure tracks. The majority of the faculty is involved with instruction of the NPS student population or in conducting research projects. There are four faculty sessions with a total of 29 participants.

2. NPS Staff

The second type of focus group is made up of civilian and military staff members who are also selected by individual name to obtain a broad spectrum of departments and responsibilities. Generally, the NPS staff performs supportive roles for faculty and administrators. However, there are some staff who have direct contact with the student body. Examples include the Research Office who processes the theses of all graduating students. Another staff code that interacts with the students on a daily basis is the Library staff. Five staff focus groups are conducted with a total of 34 participants.

3. NPS Students

The three types of student focus groups are split among Ph.D. candidates, thesis students in their final or penultimate quarter and relatively new students in their second or third quarter. It is important to achieve a mix of student curricula and time onboard

<u>STUDENT FOCUS GROUP COMPOSITION</u>		
Student Group 1 - Phd Candidates		
<u>Code</u>	<u># of Students Requested</u>	<u># of Students Attending</u>
31 Aero Engineering	2	1
32 Comp & Info Sys	2	0
34 Engn & Tech	3	3
35 Metoc	2	2
Student Group 2 - Mar/June 2000 Graduates		
<u>Code</u>	<u># of Students Requested</u>	<u># of Students Attending</u>
30 Ops A	3	2
31 Aero Engineer	2	1
34 Eng & Tech	2	2
37/39 NSA	3	4
Student Group 3 - Mar/June 2000 Graduates		
<u>Code</u>	<u># of Students Requested</u>	<u># of Students Attending</u>
32 Comp & Info Sys	3	0
35 Metoc	2	1
36 Sys Mgmt	3	2
38 NSA	2	1
Student Group 4 - 2nd/3rd Quarter Students		
<u>Code</u>	<u># of Students Requested</u>	<u># of Students Attending</u>
30 Ops A	3	2
32 Comp & Info Sys	3	0
36 Sys Mgmt	2	2
38 NSA	2	2
Student Group 5 - 2nd/3rd Quarter Students		
<u>Code</u>	<u># of Students Requested</u>	<u># of Students Attending</u>
31 Aero Eng	2	0
34 Eng & Tech	2	1
35 Metoc	3	2
37/39 Jt Sys	3	5
32 Comp & Info Sys	0	3
Total # of Students Interviewed <u>36</u>		

Figure 3.1 Student Focus Group Composition

in order to address all levels of the research process. For example, new students may be interested with finding a research topic that intrigues them and may not be as concerned with what lies ahead.

The students participating in the focus groups are selected by the Curriculum Officers based on availability. Figure 3.1 shows the curriculum code, number of students requested, and number of students that actually attend the focus groups. The total number of student participants is 36, broken out into five separate sessions.

D. KNOWLEDGE PORTAL CONCEPTS

KPs, also called Enterprise Information Portals in the commercial world, are viewed as an application that enables organizations to unlock internally and externally stored information and provides a single portal to the personalized information needed to make informed decisions (Shilakes and Tylman, 1998). The Department of Defense (DOD) is adopting KPs as a single entry point to the organization's knowledge and information resources. An example of this is the CINCPACFLT Knowledge Home Port which allows Fleet personnel to find and reuse information and knowledge by providing links to over 250 databases (Bennet, 2000). Additionally, a KP is goal-directed towards knowledge acquisition, knowledge transmission, and knowledge management (Firestone, 1999). To avoid the 'infoglut' and the mimicking of web search engines, KPs need to provide the right content in a meaningful context. Herein lies the beauty of a KP. They have powerful, robust search engines that provide concept matching, collaboration, and an expertise locator function. Concept matching is based on Claude Shannon's principles

of information theory with Bayesian probability. While web search engines use keyword searches, the KP engines can match ideas and look at word frequency and relationships between terms to determine meaning. KPs are also collaborative tools as they can be directed to search an organization's internal resources such as email, databases, word documents, and intranets to locate peers and coworkers working in similar subjects. Through the KPs searching mechanism, experts within the same organization can be identified and sought out to share their knowledge. Once this occurs, then communities of practice are formed, and the organization can share and transfer knowledge and work together towards a common goal. KPs also allow for customization and personalization, which gives the information and knowledge a comfortable look and feel. This provides that meaningful context which is key to knowledge capture and transfer.

KPs use a technology called spidering, an information gathering process in which a software code goes from resource to resource, usually web sites, and collects information and makes a list of keywords and concepts it finds. These keywords and their locations are then stored in a database on a server that is indexed so that keyword concepts and locations can be retrieved when needed. Most search engines work this way. Knowledge portals use the spidering technique but rather than storing just keywords and their locations, whole concepts, relationships, and locations are stored.

KPs are an expensive endeavor for any organization. As KP technology is so new, the return on investment has yet to be determined. In addition, not all KPs are

created equal. DON-CIO, NPS, and LMI attended a series of vendor demonstrations to determine which company and software would best fit their needs. Some vendors offered better service and more affordable price structure, while other products' strengths were customization, collaboration, and search engine robustness.

E. RESOURCES FOR THE KNOWLEDGE PORTAL

The stakeholder interviews and focus group sessions allow the interviewers to capture valuable data and information on how NPS conducts business. The sessions also provide insight on how NPS research may better answer the needs of the Navy and other knowledge-intensive processes. An example would be distance education endeavors for all military personnel. In addition, the interviews identify robust NPS databases for incorporation into the NPS KP.

Once the stakeholder and focus group members are introduced to KP concepts, they are asked what information and knowledge resources are of value to them and how these resources might be integrated into a KP. All interviewees are asked if they believe the KP can be a valuable tool for organizing existing resources and discovering new resources. The interviewees involved with the thesis process are asked various questions concerning the current process, knowledge of innovation of the process, and recommendations for the integration of the process into the KP. The findings and analysis resulting from the interview process are presented and further examined in Chapter IV.

One of the goals of the interview process is to define a list of information and knowledge resources that are useful to the NPS population. A comprehensive list of all identified internal and external resources and databases can be found at Appendix E. This list is far too exhaustive to initially integrate into the KP project. Another goal is to determine the most valuable resources for the largest number of NPS faculty, staff, stakeholders, and students. The list at Appendix E is scrubbed and the 'top 11' resources are identified. This list can be found at Figure 3.2. These top 11 resources represent those most frequently mentioned and the information and knowledge that is most accurate and regularly maintained.

1. World Wide Web
2. NPS Intranet and Library Reference Programs
3. Outlook -Personal Email and Schedule Program
4. Focus - Registrar's DB for Students
5. Full Text Theses and Dissertations
6. Maximo - Public Works Facilities Program
7. Human Resources Personnel Database
8. DORS - Comptroller Database
9. SOFS - Student Feedback System
10. NPS Financial and Trend Analysis DB
11. NPS Alumni

Figure 3.2 NPS Resources for KP

It is interesting to point out at this time that some stakeholders and focus group participants identify resources that do not actually exist. For example, many of the faculty want a dynamic resource that would list all of the NPS faculty, their current research and associated funding as well as students who were working with them. They

want to access this resource, search it and make changes to it. In other words, the interviewees could see the KP working for them with imaginary resources or their database wish list. They could see to the future of knowledge portals tapping and organizing information and knowledge that may someday exist and they could imagine how this might make their job or thesis writing easier.

F. KNOWLEDGE PORTAL AND THE THESIS PROCESS

NPS will use the information discovered during the interviews and the list of information resources to develop a CONOPS for the KP. The CONOPS is laid out and examined in Chapter V. It is important to remember that, as the KP evolves onboard NPS, the user requirements and concerns will have to be revisited. More than a few interviewees, the students, and faculty in particular, mention this as they realize that their personal requirements for thesis and project research will evolve and new valuable resources may need to be incorporated into the KP. The iterative nature of this process will be explored in the CONOPS in Chapter V.

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IV. QUALITATIVE DATA ANALYSIS AND FINDINGS

A. INTRODUCTION

Qualitative research methods are increasingly being used in the field of information science to address a variety of research questions (Westbrook, 1994). This approach is chosen by the authors of this thesis as a means to explore and discover unstructured information without oversimplifying it or losing its complexity and context (QSR, 1996). The software used for our data analysis is Qualitative Solutions and Research's (QSR's) Non-numerical, Unstructured Data by Indexing, Searching, and Theorizing Vivo (NVivo). This software is accessible via a license held by the NPS Library and so is chosen to analyze this study's data.

This chapter is comprised of three primary sections. First, a background of the qualitative analysis approach is discussed. Then, themes and findings resulting from the data collected are presented in the most comprehensive section of the chapter. The current research process is extracted from the study's data as well as a discussion of the culture of NPS. Potential innovation of the thesis research process and relevancy of thesis research to Navy needs are also examined in this section. The third and final section discusses ongoing and future reengineering efforts and applies theories discussed in earlier chapters.

B. QUALITATIVE ANALYSIS

Qualitative data analysis is a method often used for handling data that is relatively unstructured and considered not appropriate to reduce to numbers (QSR, 1996). For example, qualitative methods are used to study the complex narrative from discussion groups or videos of people at work. The purpose of qualitative methods is to understand rather than predict. Qualitative methods require an iterative approach in which the collection of data affects its analysis and in turn dictates the formation of themes. As the interviews progress the original baseline questions are modified to ensure discovery and comprehension of data. "Data collection and analysis form an integrated activity" (Mellon, 1990).

There are many techniques used to gather data in a qualitative research project. Common techniques include observation, field notes, unstructured interviewing, and focus group discussions. This thesis project primarily incorporates unstructured interviewing and focus group discussions. Both of these techniques involve the use of open-ended questions as a means to let the participant(s) tell us what we don't know. Whyte (1979) recommends that the interviewer "let the conversation flow naturally but to recognize statements which suggest new questions or even new lines of investigation." Although we begin each session or interview with a structured set of questions, these questions are merely a guide and we often explore other directions as the participant(s) may dictate. For example, during several interviews, the issue of distance

learning/education came up as an important consideration for innovation of the thesis process.

Several techniques can be employed in the analysis of qualitative research. One of the most commonly used data analysis techniques, content analysis, can be defined as "a research technique for making replicable and valid inferences from data to their context" (Kaplan, 1964). Content analysis is based on the premise that the many words from interviews and discussions can be categorized with those that share the same meaning or connotation (Westbrook, 1994).

Document coding lies at the heart of content analysis as units of data are compared to each other in terms of their fit into the coding scheme. Coding does not descriptively paraphrase the notes; rather it identifies the main and subcategories of data and clusters the categories that share some commonality from which themes are developed (Westbrook, 1994). To the novice qualitative analyzer, it might seem that coding just simplifies the data and then regurgitates it in a generalized form. This is exactly what the authors of this thesis expected when this research began. In hindsight, the software and coding allowed the authors to comb through thousands of lines of text and discover valuable information on the objectives of this study. The NVivo software is a tool that is used to code and explore documents and discover patterns. NVivo's strengths are in its structured organization and sophisticated searching. It has several options for searching that allow sufficiently complex ideas to be explored in the data (Barry, 1998). NVivo is used to code the transcripts derived from the stakeholder

interviews and focus group discussions. The authors of this thesis develop the coding scheme through an iterative process of data gathering, analysis, and revision to the coding scheme. The final coding structure can be found in Appendix F. A sample NVivo report that categorizes the data around a central theme is provided in Appendix G.

An iterative approach is required with any qualitative analysis project. In our initial coding of the data, we look for common terms used and ideas expressed by the participants. Subsequent coding and recoding of the data becomes necessary as new categories and understandings emerge. Final analysis reveals a framework of patterns from which themes are developed. This iterative approach helps ensure that the themes pertinent to the research objectives develop out of the data collected.

C. THEMES AND FINDINGS

Several themes emerge as we analyze the data collected from the focus group and stakeholder interviews. Themes regarding the current thesis process, the culture of NPS, process innovation possibilities, and the degree of Navy relevancy of student theses are discussed below.

1. Current Thesis Research Process

Data reveal that for many students the thesis research process is ill defined. The thesis or dissertation (written portion) is a requirement for graduation and is one of the single most important tasks that students accomplish during their tenure at NPS. However, many students are unaware of what the process entails, from topic and advisor

selection to thesis format and submission. What is even more surprising is the disparity that exists between the students' knowledge of the thesis process and what the faculty perceives the students' knowledge level is or should be. While students are frustrated with the lack of information and knowledge regarding the entire thesis evolution, the faculty does not appear to be concerned. One faculty member even comments that there are more than enough topics; the problem is finding enough students to work particular projects. Another faculty member states, "Yeah, the students feel a crying need for it [information] but we've never felt the need to go to greater lengths than say postings on bulletin boards."

a. The Steps of the Thesis Process

The thesis research process can be laid out in five steps. The first step is *acquiring an area of research* in which the student is interested. Data collected from the focus groups indicate topic selection is a difficult task. One faculty member points out, "The process is rather laissez faire. I mean the student acclimatizes to the environment, finds a faculty member, there's informal talk and ultimately a topic emerges." The majority of students do finally get their thesis topic from a professor but this process is often hit and miss and extremely informal. It involves a great deal of 'word of mouth', talking to fellow students, and going door-to-door reviewing bulletin boards outside a professor's offices to see what might be posted. Several students mentioned they would like to have something like a 'thesis clearing house' where all faculty can input research areas from which students can develop their theses.

Two other approaches to topic selection are worth mentioning. First, several curricula host a thesis seminar or colloquium for students in the later half of their graduate studies. Faculty and students come into these seminars to discuss current and future research areas or to brief their recently completed theses that may need additional research in a related area. Finally, in a few instances, students bring their thesis topic with them from a previous command.

The second step is *thesis advisor selection*. Most students have a primary advisor and a secondary advisor or reader. The primary advisor is a doctoral faculty member who is generally very knowledgeable in the primary area of research. He or she provides input, guidance, and recommendations in all areas from the research methodology to the final draft of the written thesis document. The secondary advisor provides input on the written thesis in format and content. He or she may also specialize in an area that complements the primary research area. An analysis of the data shows that although still an informal process, students do not have as much difficulty in the area of advisor identification as they do in topic selection. Often times it is intuitively obvious which faculty member would best serve as advisor based on his/her primary research area. It is then just a matter of whether that faculty member is willing and available to serve as an advisor. The faculty data reveal an interesting approach to this step. They refer to advisor selection as more of a proactive approach on their part. At no time did any student ever refer to this. Faculty believe they can recruit students on a daily basis by merely taking 5-10 minutes out of given class periods to talk about their interests and

research areas. One faculty member comments, "We will teach a 2000 level course in our area of research and identify the best students and then try to snag them before anyone else does."

There are a few tools that the students can use to help them in this step. Several departments post lists of all faculty members and their area(s) of expertise on their departmental websites. These lists can be used to help narrow the search for a thesis advisor. Additionally, there are significantly powerful student networks whereby students find out (by word of mouth) which faculty are the best advisors. These networks must be tapped into through the KP in order to capture the tacit knowledge that lies within them. This is explored further in Chapter V.

The third step in the process is the *submission of the thesis proposal*. At this point, the student thesis process becomes more formalized. The proposal has a specific format and a signature procedure that must be followed for submission. Analysis of the data collected shows that although more formalized, information and knowledge on submission of the thesis proposal is not being shared campus-wide. Students are unsure as to when they should submit their proposal, what format is required, and how much detail it contains. The problem is exacerbated by the fact that thesis advisors have differing requirements and expectations regarding the proposal, even within the same department. The faculty data reveal that there are primarily two faculty camps of thought on how the proposal should be submitted. Many faculty believe that a great deal of time and effort should be spent thinking about and writing the proposal. A well thought out

proposal facilitates critical thinking and thesis writing. Other faculty believe that the thesis proposal is more of a formality and merely a block that should be checked.

The fourth step for the student is the *research and writing of the thesis*. This step is also formalized yet can prove difficult for some of the students. Research is left to the individual student and advisor(s). The focus group data in this particular area show no common or central theme and appear to be very individualistic. Some students are very comfortable with conducting research within the variety of resources the School has available. Many are using Lexis-Nexis and walking the stacks in the Library. Others are not as comfortable but are assisted by the thesis seminars run by their curriculum.

The writing of the thesis is assisted with a template and several preparation manuals and documents. Again, many of the students are unfamiliar with the formatting requirements and the tools available to assist them in the thesis writing process. One student comments that he found out about the template through a friend of his, and many had no idea that a template or thesis manual even existed.

The last step in the student research process includes *acquisition of signatures and submission of copies and forms* to the Research Office. Often this step is referred to as 'getting your green card'. After the students complete the above step, the Research Office issues them a completion card that serves as a proxy diploma. Analysis of the data shows students are very familiar with this portion of the process. The students' ultimate goal is to obtain a green card and as such seem to be extremely familiar with the steps to completing this final hurdle in attaining a Master's degree.

b. Analysis of the Thesis Process

When the authors of this thesis reported to NPS in July 1998, the aforementioned steps were not dictated in any formal manner. They were discovered through informal discussions with other students and faculty. Soon after the focus groups were conducted, the Research Office recently created a web page that discusses the writing and submission of the student thesis (<http://web.nps.navy.mil/~code09/research1>). The web page contains the template as well as an electronic copy of the thesis preparation manual. This is just one of the ways knowledge of the thesis process is created and shared. The data show, as previously mentioned, that bulletin boards and departmental websites are useful tools for sharing information on the thesis process. However, the most important tool for sharing knowledge is person to person interaction. The peer network among students is extremely important. One faculty member comments that the 'student underground' is an invaluable tool for sharing knowledge among the students. These small and scattered networks are specific to departments and subcultures like the Marine Corps Officers and often have the requisite knowledge. Unless you (as a knowledge seeker) know who they are, knowledge is just not shared.

Another weakness of the current thesis process is the lack of a comprehensive collaboration mechanism. An overwhelming majority of both faculty and students feel an expertise locator/collaboration-type function is needed in the thesis research process. The faculty is very interested in knowing what research is being conducted by thesis students and other faculty and where their funding is coming from.

Students are desperately interested in knowing what areas of research the faculty is working on in order to align their thesis with a particular topic and/or faculty member. Additionally, there is no formal process by which curriculum sponsors (e.g. Naval Space Command (NAVSPACE), Chief of Naval Operations, Director of Space, Information Warfare and Command and Control (CNO N6), Space and Naval Warfare Systems Command (SPAWAR)) can easily identify thesis topics and offer potential research dollars to NPS. Faculty and students would like to see a periodically updated list of topics from organizations such as the Joint Staff and the Strategic Studies Group as well as curriculum sponsors like those mentioned above.

The data also show that collaboration across departments is quite difficult. The students would like the option to do a 'cradle to grave' thesis. For example, a student in financial management could look at the fiscal ramifications of a particular area while another curriculum student examines the technical or scientific aspects. One student mentioned that she was trying to do a thesis that was cross-departmental. She ended up having to stop because it was in the 'way too hard' category. "The National Security Affairs (NSA) people couldn't understand why I was trying to interject a financial aspect of their program and the Systems Management people couldn't understand why I was taking on such a lofty NSA topic."

Finally, the data reveal that students are frustrated with the administrative and logistics aspects of the thesis process. Many students want a general timeline from their respective curriculum offices. Most students do not realize the amount of time and

work the thesis entails and have difficulty managing their time with the significant course load they are required to take. One student comments, "You know, there's no one place where you can go to get, you know, the legitimate thesis process." Another mentions, "I don't think I really know what the thesis process is. How do you find out, other than word of mouth through someone who, you know, went through a lot of sweat, got their green card and has a horror story to tell?"

2. Assessment of NPS Culture

Nissen et al (2000) discuss the importance of contextual factors that impinge on the successful implementation of KM systems. Kellman (2000) states that the biggest challenges for successful KM application are cultural, not technological. Success in the specific application of a KM tool such as a KP often hinges on engendering an atmosphere of trust, sharing, and benefit. An analysis of the data reveals two areas from which themes develop. First, NPS exists in an environment that is both military and academic. These subcultures present issues that must be considered when assessing the organization's knowledge-friendly-culture atmosphere. Second, an assessment is made of the willingness of NPS personnel to share knowledge or their preference to hoard it.

The focus group discussions and stakeholder interviews began with the assumption that the military culture is more competitive and therefore prone to knowledge hoarding. Conversely, by virtue of its educational context, the academic culture was assumed to be more conducive to sharing. Several interviewees disagree with this assumption – enough so to render the assumption invalid. In the current thesis

process section, we describe the disparity that exists between the students' (largely military) knowledge of the thesis process and what the faculty (academic) perceives the students' knowledge level to be. One of the possible explanations for this disparity may be related to the differences between the military and academic cultures. As one student comments, "We (military) don't think like them (academia) and they don't think like us." Another student states, "I think the root problem here at NPS - - it's a great institution - - it just needs to change the way it does business. They can't impose a civilian, academic regime on a dynamic, ever-changing team-oriented group, which is the military." A third student comments, "The academic system itself is not set up to be very dynamic. It's entrenched in an archaic method of instruction, that is not very ready for dynamic interaction."

The authors of this thesis do believe that there is more information and knowledge available regarding the thesis process than the focus group data indicate. It may require a bit more searching than students expect from their typical military experiences. What must be understood is that graduate school is unlike any other Navy school. Yes, there is 'the gouge' but there is no clearly defined, formalized process that is closely followed. There is no thesis Standard Operating Procedure (SOP) and that is what students are looking for. We certainly do not believe the students are lazy. Military officers are simply used to operating in crisis mode off a SOP that can be modified to the existing situation. When there is no readily available SOP, there is confusion, frustration, and a belief that the information is not out there (so they stop looking). The students have little

difficulty performing the research itself, they are merely looking for a formalized process to follow or modify as the situation warrants. Most students are oriented to this military culture. Personnel in academia may not understand this. For example, a stakeholder describes NPS in the context of an academic model versus a military model. "Academia expects process, military expects quick movement. Consequently, you get lots of bruised feathers." Finally, a Curriculum Officer (military) comments, "For technology to be successful, you also have to have a culture that embraces that technology. You must shift the academic paradigm. I honestly don't think people are knowledge hoarders. I think in the military it's actually the other way."

Is NPS a knowledge sharing or knowledge hoarding organization? The common theme here is that faculty, students, and stakeholders can passionately argue both sides. Analysis of the data reveals that many participants believe sharing is personality-driven and/or the specific type of knowledge leads to different levels of sharing. A stakeholder describes how administrative knowledge leads to open sharing for corporate decision making while knowledge regarding intellectual property leads to higher levels of protection and less willingness to share. One faculty member points out, "Some people are going to have no problem sharing all their data, information, and knowledge, and others are going to want to keep it very close to home." The time to input and locate or determine who to share knowledge with appears to be the key.

Most believe that hoarding is not intentional, rather it is a consequence of a lack of a conduit or process (what to share? how to share? with whom to share?). The bottom

line is that sometimes it is just too hard. "Students are ready to share, there's just no conduit to do it." Another student comments, "I haven't run into any intentional hoarding, there's just no central repository for the knowledge." Several stakeholders comment, "You don't think other people need to know," and, "I'm not sure it is hoarding as much as not knowing who else needs it and how to get it to them."

Many participants feel there needs to be a reward system or incentives in place to encourage sharing. This is especially important to the faculty promotion and tenure process whereby protection of intellectual property and publishing rights become a fierce competitive force. "You have to be careful who you talk to. If you give them the idea of what you're going to do, they'll have it published before you do. Until you have it published, it is hard to share it." Protection of intellectual property is a strong motivator. Students largely share information and knowledge as a means of survival (a common aspect of the military culture) yet there are a few students who are competing for that 'A' and consequently not motivated to share. One student (PhD) calls it a 'zero-sum game' and he further states that if he shares his knowledge then he might lose the advantage over a source of funding. On the other hand, nearly all second quarter students feel NPS is an openly sharing culture.

Finally, there appears to be a common feeling among the stakeholders that if NPS could promote goal congruence, better sharing would result. One stakeholder comments, "The sharing that does occur is confined to networks of people who have a common goal." Another states, "This is a cultural, not a technical issue. We have goal conflict,

people do not hoard. People need to agree on the goals of the organization in order to promote sharing." A third stakeholder believes, "We need to facilitate goal congruence but it is very hard to get consensus [regarding the goals of the organization as a whole]."

3. Innovation of the Thesis Research Process

Two focus areas emerge as we analyze the data and develop themes regarding thesis process innovation. First, much of the innovation comes from students, faculty, or stakeholders and involves recommendations they believe will improve the thesis process. Second, many ideas discuss how the incorporation of a knowledge management tool such as a knowledge portal can improve the thesis process.

As described in the current thesis process, many students are frustrated with their lack of knowledge of the thesis process. One student even wanted a '**Thesis Manual for Dummies.**' However, many of the innovative suggestions are more detailed and come from students, faculty, and stakeholders alike. There is a strong desire among the students to **approach the thesis as a team project**. They feel that this is a more real world approach, as one normally is not going to be working in a vacuum. Students feel it will be invaluable to work together on the project team with for example, people from Meteorology, Computer Science, National Security Affairs, and Financial Management. "Then, take a current hot topic that's going on in naval aviation and describe the problem. Take it from cradle to grave and there is your thesis."

Faculty and stakeholders are interested in improving the quality of theses and increasing the dialogue among NPS, the Fleet, and curriculum sponsors. One department

is emphasizing thesis quality in a number of different ways. For example, the department found that students were writing the 'Great American Novel', just a compilation of term papers and various courses. The department has **put a cap on the number of words** and has found theses more succinct, relevant, and of higher quality. Stakeholders believe we need to **make the processes that are in place now more effective**. "We need to do better at matching student interests to faculty expertise." Another stakeholder believes, "We must actively solicit topics the old-fashioned way from the sponsors, the Fleet Commanders, and other DOD agencies."

Another recurring and related theme is the necessity to '**enhance the School's reputation**'. Although not immediately obvious, this has potential impact on the student thesis process. Most participants believe there is a need to advertise NPS capabilities, faculty expertise, and potential DOD problem areas that could evolve into student thesis work. This is a two-way street. It involves not only NPS input, but Fleet, sponsor, and possibly industry contribution as well.

One of the requirements to make this reputation enhancement a reality is to **establish a research focal point for NPS**. Many feel this should be the Research Office. A second requirement could be an electronic advertising tool such as a knowledge portal. The research focal point could identify not only research that is on-going at NPS but research opportunities outside of NPS as well and advertise it via the KP. Then students could go through the KP to the Research Office to find potential thesis topics and access information.

Enhancing the School's reputation could be assisted through the KP as well but may also require some public relations work. If organizations were more aware of the work being done at NPS, they might be more willing to support the School. **Encouraging a continuing connection to the School** is a necessity. Alumni are great free advertising for NPS. This continuing connection would allow alumni to keep abreast of on-going research in their field as well as provide feedback on current (military) problems that need to be solved. One faculty member comments, "If there were a way for the Third Fleet Commander to know what we've actually done work on and he had a similar or related problem, how wonderful that would be if we could actually help solve it. Then, he'll be coming here not just to visit, but to say thank you and get more."

The KP could help in other ways. There is a need for an **expertise database for everyone at the School** - student, faculty, and staff. A good focus area for the knowledge portal would be to better match student expertise to faculty areas of research and connect faculty knowledge to sponsor needs. One faculty member points out, "Say a sponsor out there wants to know, hey, does anybody have any background in this particular issue, because they see it's coming up or it's hot. If it turns out we have one of the world's leading experts in that area, unless you happen to call the right person, and ask the right question at the right time, you won't know that and an opportunity will be lost."

There are several contributions the faculty could make to enhance the student thesis process. First, **encourage the faculty to contribute to a Frequently Asked**

Questions section of the knowledge portal. This might include helpful thesis or research hints, a dynamic and current suggested reading list for a variety of research areas or even advertisement for small projects that could lead to potential thesis research areas. This smaller project work could even be offered as Directed Study credit for students who are interested but have little 'space' in their matrix of required courses. The guideline for contributions to the portal should be any information that a faculty member thinks might be of interest to the students and related to thesis work. Rather than tacking information to a bulletin board outside an office, contribute it to the knowledge portal. Along these same lines, **faculty must ensure that they continue to contribute and have write access to their record in the faculty expertise database.** This should be periodically updated by the faculty to reflect new research and expertise areas as well as updated qualifications and credentials.

Second, the faculty should come together with a **standard format for thesis proposal submission.** The standard should include when to submit the proposal, the amount of detail it should contain and the basic format. Additionally, faculty should work with the Research Office to **establish a SOP for the thesis.** This would include the already existent template as well as a general timeline that could be applicable to all curricula, regardless of length. This standardization will be a difficult endeavor as it encroaches on the autonomy of the faculty and the individualism of the students. However, as the data reveal, students generally would like to see more standardization in the administrative aspects of the thesis process. In addition, this might go a long way towards minimizing the differences between the military and academic cultures.

Finally, the faculty should establish a student peer review of the thesis process. The review should occur throughout the process and include a review of student selected topics, the proposals that are being submitted, data collection efforts, and problems and analysis findings. Students could take turns presenting their information to the group while the remaining students and faculty ask questions like, "Have you thought of this?" and "Why not try that?"

4. Relevance to Navy Needs

The final area that we examine centers on the question of Navy relevancy of student theses. There are two issues that are at the heart of this theme. First, are student theses generally relevant to the needs of the Navy? Second, how can the thesis process be improved to make student theses more relevant?

The data show that many of those interviewed believe that student theses are generally relevant to Navy needs. However, military faculty and staff (Curriculum Officers) believe they could be more relevant. One comments, "Some of the thesis topics go off on a fringe or non-military subjects. Then community sponsors put pressure on the curriculum to do more military-relevant theses." The deans and faculty believe that the theses are relevant. One of the deans states, "More and more of our students are working on topics developed directly by (one of) the Fleet or Joint Commanders (CINCs) in answer to a CINC problem. The student typically works with a science advisor on the CINC staff and a requirement emerges. The student finds an advisor and the thesis is written closer to CINC requirements." The stakeholders have varying opinions on the

degree of relevancy that the theses should be. Many are cautious about swinging the pendulum in either direction in that a delicate balance should be maintained between applied and interdisciplinary work and military-relevant theses. When one stakeholder is asked if student theses could be more relevant, he responds, "Sure they could. Should they? Probably, but I hope that doesn't lead to everyone having to do a thesis of high relevance. The thesis process should start with enthusiasm about what the student is doing and usefulness to human kind. It doesn't work to pursue research without enthusiasm. The purpose of the thesis is to develop analytical skills that can be applied to Navy and other problems."

Analysis of the data also reveals that interview participants have some ideas on how to improve the thesis process to support higher relevancy. Most of the ideas center on the **need for a better connection to the Fleet**. Many faculty and students would like curriculum sponsors to contribute to a **repository of Naval problems**. A faculty member comments, "We would really like to know what projects interest the Navy. What are their top 10, 20, 100 most interesting problems?" Many participants believe it would be useful to have better links to all officer communities because it would not only help focus student research but it would also allow alumni to contribute problems for NPS solution once they had returned to the Fleet.

There are a few hurdles to overcome in establishing a better Fleet connection. First, topics often need, but do not come with, requisite funding. For example, one stakeholder comments, "The CINC sent in some really neat problems but no one was

interested in them because they weren't linked to reimbursable programs. The faculty was not willing to take them on. We need to have money come with the problems. We talk about cradle to grave education but at the moment, we are not funded to support it."

Second, it can be difficult to get 'good topics'. The Navy needs to suggest topics they are interested in having the answers to when the thesis is completed. Often, answers are wanted immediately, not six months from now. One stakeholder points out, "It is difficult to get the curriculum sponsor to come up with good topics. They need to have it completed tomorrow. It is unrealistic - - just short of solving world hunger."

D. REENGINEERING OF THE THESIS RESEARCH PROCESS

In order to institute some or all of the innovative ideas suggested above, the NPS thesis process should be reengineered. Research shows that process design must be integrated with system design (Nissen et al, 2000). An organization will be successful only if it conducts an analysis of the processes, identifying the practices within the organization that inhibit or promote knowledge creation or transfer and implementing the IT that supports the management of the organization's knowledge. One faculty member comments, "Numerous organizations incorporate KM tools but don't change the processes behind it. A bunch of links on a web page doesn't help unless one reengineers the processes that lead to it."

Nissen (1998) describes reengineering in terms of process redesign activities to increase knowledge and understanding. In the final section of this chapter, we use the

Amalgamated KM Life Cycle Model described in Chapter II to reexamine the thesis process and to determine which aspects of the thesis process could or should be reengineered.

1. Create

The discovery and development of new knowledge is a performative activity in the KM Model. Nissen et al (2000) state that knowledge creation is more difficult and uncertain than knowledge capture. We believe that knowledge *creation* in the thesis process is probably the most difficult of all the activities to reengineer. The thesis process involves the individual NPS students and their journey through discovery by means of research, synthesis of ideas and concepts, to the writing of completed theses. Advisors and other NPS faculty assist the students with this activity but it remains an informal process. Knowledge creation can be enhanced through a two-fold process. First, NPS should create a student and faculty expertise database as well as a repository of Naval problems and research topics. Second, there must be a mechanism in place that enables the NPS population to search and retrieve the information resulting in increased collaboration and discussion through common interest groups. A KP could facilitate this through its expertise locator and collaboration function.

2. Organize

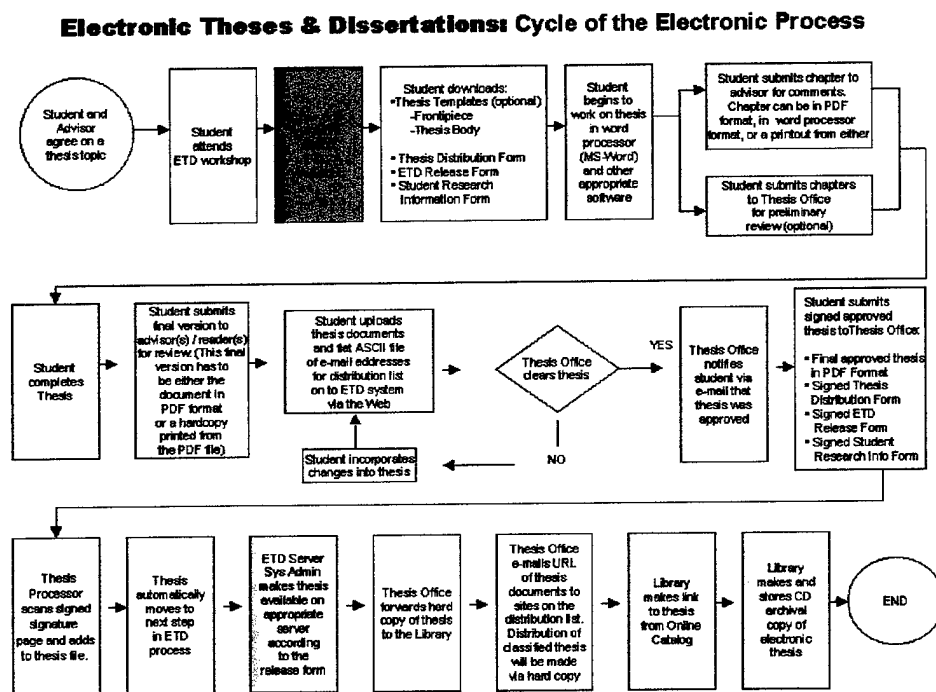
The *organize* activity is a supportive or sharing one and involves deciding what information is important, determining how to store it, and developing methods to retrieve it. The current thesis process poorly supports this activity. With the creation of the

databases mentioned above, NPS must find a method to organize and retrieve the knowledge created. Currently, students walk around to retrieve expertise information, research topics, and facilitate knowledge transfer between themselves and other students and faculty. The process should be enhanced to allow students to retrieve and transfer this knowledge electronically. NPS must find a way to access the student underground network and capture the resulting gouge that is available through these networks. A KP's robust search engine, collaboration functions, and the user's ability to customize and train intelligent agents through the KP could assist in this endeavor. However, a KP is not a panacea and students should not forego 'hitting the pavement' entirely in favor of the KP.

3. Formalize

NPS has already taken steps to make the thesis research process more formalized. The School has recognized that such *formalization* assists in the sharing and transfer of knowledge. The Research Office facilitates this activity with the Electronic Thesis and Dissertation (ETD) procedure (depicted in Figure 4.1). The Research Office was aware that other universities were making full-text theses available for retrieval and future research. Currently, the NPS population can only electronically access abstracts of thesis and dissertations. Full-text documents are available via hard copy. NPS personnel felt they needed to convert theses to electronic format and utilize the full-text conversion software Virginia Polytechnic Institute was offering free to other academic institutions. The ETD procedure would involve a new software program, training, IT support, and a more concrete process that could be understood by Research Office staff, students, and

theses advisors. A committee was formed with individuals from the Research Office, Library, and student population. The committee built a web page, made the thesis template and Thesis Preparation Manual available electronically via this web page, and held training for the student population. Figure 4.1, which is also available on the web page, shows the thesis procedure with each step color-coded with whom is to perform the step. Currently the Research Office is testing the ETD process with the Operations Research and NSA Curriculum. All of NPS unclassified theses are expected to transition



Description of Responsibility by Color

Light Green - Student
 Dark Green - Faculty
 Blue - Research Office
 Purple - System Admin for ETD
 Orange - Library

Figure 4.1 ETD Wire Diagram [from NPS Research Office Web page]

to the ETD process by the Winter Quarter 2001. Soon thereafter, all theses and dissertations should be available full-text for retrieval.

4. Distribute

This thesis has suggested that bulletins boards, websites, list-servers, and the Internet are all means to *distribute knowledge*. The ETD process can also be thought of as an information and knowledge distribution system. Once the KP is installed, it will be able to directly link to the ETD database to search and retrieve theses and dissertations. The distribution of knowledge will be faster and much more specific to the needs of the KP user.

The aforementioned thesis colloquium/seminar could be another distribution method. Every week, the curricula have set aside a class period to conduct business. Traditionally this time has been set at 1500 on Thursday afternoons. Some curricula use this period effectively; others rarely meet. These sessions should be conducted weekly and used primarily for the purposes of information sharing and knowledge transfer regarding the thesis process. These Thursday sessions could be held every quarter for one credit hour. Session members (faculty and students) should be divided based on expertise and interests (information gleaned from the expertise database). These Thursday 'faculty/student rap sessions' could include activities such as faculty research presentations, research methodologies and technical writing seminars, timeline specification and ETD and KP training sessions. These sessions should include NPS staff members as well. Faculty could also arrange to meet with other seminar interest groups

in an effort to cross-pollinate and establish a cradle to grave thesis process. Faculty, with the assistance of the Curriculum Officers, should arrange for curriculum sponsors, Fleet Commanders, other DOD, industry, and NPS faculty to come in and brief their latest challenges, problems, successes, and potential research areas. This expanded membership enriches the knowledge capturing and sharing environment of the Thursday seminars and makes them worthwhile evolutions for both students and faculty.

5. Apply and Evolve

Apply and evolve are both performative activities. The use of knowledge to make a decision or perform a cognitive task is called the application activity. As stated earlier, it is a challenge for an organization to enable personnel to interpret the knowledge, apply it to their experiences, and learn from it. This will also be a challenge for NPS. As students become familiar with the new procedures involved in the thesis process, they may be able to take this learning and apply it to other situations and, possibly, problems they encounter in the Fleet. The KP should help to facilitate this activity. The electronic capture of information and knowledge resources will be instantaneously available to students. The KP's ability to quickly search these resources through concept matching will help students use this knowledge to perform the cognitive task of learning.

Despres and Chauvel define the evolve activity as the refinement and continued development of knowledge (1999). Evolution of KM and the learning process is important to all organizations, including NPS. It is apparent from the data collected that thesis process reengineering through innovations such as the ETD and tools like the KP

must evolve in order to continue to be of value to NPS. As knowledge evolves it can create new knowledge that is of importance to the organization.

There are numerous examples of innovation using IT tools described throughout this chapter. The ETD procedure and KP tool can be used to facilitate knowledge creation and sharing. However, knowledge from the thesis process will only continue to evolve, as NPS is determined to remain flexible and adopt continuous refinement of the process. For example, the ETD procedure originally was mandatory for two curricula. The Research Office realized that the particular curricula that they chose were lacking in basic computer skills to convert the thesis document to the correct electronic format. Therefore, the Research Office put together a systematic procedure, posted it in the lab, set hours for lab tutoring sessions, and made this particular step optional for Summer 2000 graduation. Other refinements will be required, as further experience with the ETD will reevaluate its benefits and drawbacks.

Create	Organize	Formalize	Distribute	Apply	Evolve
Research Office website	Thesis template	Research Office Website	Thesis seminar	Student peer review	Collaboration (KP)
Thesis project team	Thesis prep manual	Expertise locator (KP)	Department websites	Thesis seminar	
Expertise database	Expertise locator (KP)	Standard thesis format	Word of mouth	Word of mouth	
Collaboration (KP)	Thesis timeline Standard thesis format	Thesis SOP Fleet thesis repository	Bulletin boards Student peer review		
	Thesis SOP	ETD procedure	Fleet thesis repository List servers Internet		

Table 4.1 KM Suggestion Table.

E. SUMMARY

The analysis and findings from the data collected have covered a broad spectrum. Some of the themes that developed out of the data were not a surprise while others were quite revealing and intriguing. Table 4.1 takes the activities of the Amalgamated Life Cycle Model and organizes themes and recommendations discussed in this chapter under the appropriate headings. This table displays the ways that KM and KM tools such as a KP can be used to innovate the thesis process. It is important to remember that process innovation and/or reengineering efforts do not take place nor succeed overnight. These efforts require careful planning, constant monitoring, and continued flexibility to unforeseen consequences. In the following chapter, we outline a general operational concept for the NPS KP and how it might interact with and assist the student thesis process. We also examine change management issues that must be considered to facilitate successful innovation and reengineering efforts.

V. CONCEPT OF OPERATIONS

A. PURPOSE

The focus of the KP is to capture, store, and distribute knowledge for use by NPS personnel. The goal of the KP is to take the knowledge that exists in paper and electronic documents as well as that which resides in human minds and make it available throughout the NPS organization. The purpose of this concept of operations is to provide a general implementation plan on how this might best be accomplished.

This CONOPS will not discuss the software, hardware, and telecommunications needed to support the KP in detail. The NPS Library Staff, Information Technology Services Department (Code O5), and the contractor (LMI) are working these technical issues. Our focus is on the implementation of the KP as it relates to the student thesis process. We also examine some of the issues that may impact implementation. Finally, we explore the change management issues that must be considered for successful implementation.

B. ISSUES AND CONSTRAINTS

The Federal Government and DOD recommend the use of Commercial Off The Shelf (COTS) software. As previously mentioned the software vendor Autonomy is selected for the KP project. It is the best COTS portal software of sufficient power for an enterprise-wide implementation and provides document and database search and retrieval,

expertise locator, and collaboration functions. Additionally, the NPS KP design should be consistent with the Next Generation Library (NGL) project being developed by DON-CIO. Not only does this enable the sharing of portal development, funding, and licensing; it allows NPS to provide information support to NGL users. Designing the two KPs to intercommunicate benefits both Naval populations in Monterey, CA, and the Washington Metro Area. Limited funding levels and the lack of long-term technical support are constraints that should be further examined prior to implementation.

C. STUDENT THESIS PROCESS AND THE KP

There are other KM tools available, but the knowledge portal seems to be the best tool for the NPS organization as it supports KM, networking, and collaboration and provides high quality content access from the desktop. Many of the innovations and reengineering efforts suggested in the previous chapter can not be performed by the KP alone. Databases must be created and ways of doing business must change for the KP to be an effective tool for improving the thesis process. However, some immediate steps can be taken to ensure the KP is successfully implemented. First, identify a pilot group of students and faculty that are willing to evaluate the functionality and usefulness of the KP. Ideally, these participants would include individuals who participated in focus group discussions earlier in the year. It is important to include a mix of backgrounds, skills, and even those who are skeptical of the success of the KP. With respect to student selection, we believe those in their fourth or fifth quarter would be ideally suited for the pilot group.

Those further along in their studies will be well into their thesis and may not fully benefit. Likewise, those new to NPS may not be able to provide the most thorough evaluation of the usefulness of the KP in the thesis process. Training on the KP must be provided to the pilot group and hands-on demonstrations given to ensure they are familiar with the KP and the evaluation process. Finally, incentives such as offering students course credit or linking participation to the faculty promotion and tenure process may be the key to ensuring a comprehensive and robust evaluation.

Second, the KP should initially focus on access to internal resources and explicit knowledge within NPS. Chapter III provides a list of the top 11 resources identified by focus group and interview participants (refer to Figure 3.2). Of these 11, the resources most critical to the thesis process are the NPS Intranet (specifically the Research Office web page), Focus (the registrar's database of students), and the full-text theses and dissertations. These resources will allow the participants to set up agents through the KP to access information and knowledge regarding the thesis process. It will provide users with a better understanding of past research as well as continuing research that may be needed in a specific area. It will allow faculty members to access the student information to better understand the demographics of their classes, where students' expertise lies, and potential partnering for future research.

Third, access to tacit knowledge and collaboration functionality should be made available through the KP. However, the capture of tacit and explicit knowledge must occur first. Nonaka (1991) describes four patterns involving the capture and transfer of

tacit and explicit knowledge that interact to create new knowledge within an organization. Nonaka describes that first the tacit 'secrets' of the organization must be learned (socialization). Then these secrets must be translated into explicit knowledge that can be communicated (articulation). Third, the knowledge must be standardized and put together into a manual or workbook and embodied in a product (combination). Finally, through the experience of creating a new product, organizational members can enrich their own tacit knowledge base (internalization).

In the NPS thesis process, socialization does occur. The students share their tacit secrets (the gouge) via word of mouth through the student underground. Unfortunately, this is often where the process stops. By incorporating a student-access only chat room or bulletin board feature in the KP, the gouge can be translated into explicit knowledge and articulation occurs. Knowledge regarding the thesis process, lessons learned and frustrations experienced, tips for using the thesis template, and recommendations on the best thesis advisors could all be shared in this manner. This knowledge can be taken and standardized into an electronic manual via the KP. Once students begin to use this explicit knowledge and embody that knowledge into their own thesis process, combination occurs. Increased collaboration, active involvement and personal commitment should result as students contribute to the KP and find the captured, now explicit gouge of great value, thereby enriching their own tacit knowledge base. Collaboration capabilities will be far more useful once the faculty database is developed

and the student database made more robust. It will allow students to more readily link to professors and identify potential research areas for thesis development.

Finally, with respect to the thesis process, the KP should add external resources. Unfortunately, the primary resource that students and faculty would like to see does not exist. One student refers to this database as a 'thesis clearinghouse' - a database that includes on-going and future NPS faculty research as well as a Fleet-contributed repository of Naval problems. There is an obvious need for this type of database. It could be built and maintained using the KP and access to this knowledge resource by students and faculty can enhance the thesis process and ensure continued Navy-relevant theses.

Implementation of the KP in support of the thesis process can only be successful if this type of gradual approach is taken. The initial pilot group's evaluation is key. As time progresses, this iterative implementation approach should be used whereby the system evolves through gradual addition of resources, functionality, and user groups.

D. CHANGE MANAGEMENT ISSUES

Leavitt (1965), Davenport (1993), and Nissen (1998) discuss innovation through IT and the requirement that the people and processes be taken into account when implementing a change. Additionally, there is an awareness of the interdependencies between the organization's structure, its technology, its people, and the processes by which employees do their work (Bancroft, 1992). Change in one area has a ripple effect

on all others. Numerous technological innovations are unsuccessful because those implementing the change fail to consider the human factors that could impact the success of the implementation. The most successful approaches involve the user. In this section, we examine some of the factors that may affect successful innovation of the thesis process. We also provide some insight and recommendations to successfully managing the changes ahead.

Many factors can affect the implementation of a successful change to an organization. Bancroft (1992) describes these in terms of barriers to change and outlines four categories:

- Resistance to change – if the organization has had success to date, why is there a need to change?
- Time – it takes too long to plan and implement, momentum could be lost.
- Complexity – it's just too hard, it needs to be simpler.
- Skills – the organization cannot afford to re-train its workers or afford to hire consultants.

NPS must be aware of these barriers and should expect to experience many if not all of them. Some resistance to change by the students and faculty can be expected as at the outset, these changes will require additional work and time (weekly thesis seminars, KP training and evaluation, and digesting the new formalized thesis process). Buy-in from the initial pilot group will be key as its members can see the value in the KP and in turn convince their peers that the changes are for the better. Incentives such as credit

hours for students and faculty participation tied to promotion and tenure outcomes may also help minimize resistance.

The time barrier as well may be experienced by many NPS personnel. For example, the Research Office is anxious to push along faster on the ETD process but realizes the importance of staying flexible with respect to the student's needs and being patient with the process. The students may get frustrated as well as they learn to use the KP to assist them in the thesis process. Patience, flexibility, and training such as the 1500 Thursday sessions will help reduce this barrier. Additionally, the rapid student turnover rate may be beneficial. Once the pilot group has completed its KP evaluation and the thesis process is evolving, first quarter students should be brought in to gain additional buy-in and may help to rally support from the faculty members.

The complexity and skills barriers should be considered in concert with one another. No assumptions should be made regarding the skill level of the personnel in the organization. Again, training and flexibility will be key. For example, if the process of using the KP's expertise locator function is too complex, provide additional training or make the function easier to use. If the thesis clearing house database does not enhance thesis topic selection, revise the process.

Additionally, Bancroft (1992) points out there is a more subtle issue that, if not considered, could become a major roadblock – culture. In implementing a technological change, it is important to recognize both the prevailing organizational culture as well as the various subcultures within NPS. For example, NPS faculty must understand the

military student's need for a formalized thesis process. Likewise, the military student must understand that in academia there is not a SOP for everything. Arriving at a mutual understanding will be a difficult and lengthy process, but not impossible. As the students work with the faculty, particularly during the Thursday rap sessions, over time a better understanding of the other's sub-culture should result. A technological change may fail unless these types of differing cultural values are understood. Strategies for dealing with cultural issues do not involve changing the culture immediately; rather they involve minimizing the negative aspects of the culture and the differences between sub-cultures.

There is a variety of aspects that should be incorporated into any change management plan. Planning is the key. Telling people a change is coming is not enough; senior management must be directly involved, as well as the rest of the organization, early in the process. Curricula Officers, who have direct contact with the students from the first day, can present the change as an improvement to make their lives easier. Department Chairs should promote the change with their staff and faculty. Involvement leads directly to commitment (Bancroft, 1992). Involving several key players at NPS including the students, the Library, the Research Office, and essential faculty ensures the organizational commitment that is required.

An effective change agent can also be crucial to garnering support and commitment from the people most affected by the change. The change agent or agents must be influential with the entire organization, both those above and below them in the organizational hierarchy. They must be highly respected and actively involved in nearly every step of the process. They must understand the need for frequent, meaningful, and

believable communications and be accessible to the entire organization. Such change agents at NPS could be Department Chairs, Curricula Officers, Library, and Research Office staff and even some of the students.

Finally, technological change must be managed from the very start, when the need is emerging. Key people and the roles they will play must be identified early in the process. This process began with focus group member selection and should continue with the pilot group selection. Involvement by the users is critical to implementing a successful change. Additionally, key players in the Research Office, Library, and students themselves must be identified to champion and manage the change effectively.

Managing a change is difficult and requires very different techniques than those used to manage a steady state. Change is movement from a current state to a future vision that requires being clear on the steps to get there. It is this movement from the current to the future that brings about the transitional state (Nadler, 1981). Transition managers must be continually aware of and concerned with resistance to change and struggles over organizational control and power. Organizational consultant David Nadler (1981) suggests some steps for managing the transition:

- Communication – organizations rarely communicate as much as people require even when they think they do.
- Multiple leverage points – major change disrupts the equilibrium of the organization. To shift toward the state you want, managers must apply leverage.

However, leverage points are not obvious and are almost never where the symptoms are felt.

- Specific transition organizational arrangement – a strategy is needed to manage the complex and shifting nature of roles, tasks, and authority.

With respect to the changes in the NPS thesis process, several of the above issues must be addressed. Communications with the NPS population can occur in several ways: via the Intranet and Research Office web page, through the various curricular offices and via faculty departmental meetings. Leverage can also be applied throughout the organization. For the faculty and stakeholders, it can mean better pairing of student expertise and interest with faculty research and continued, if not more, Navy-relevant student theses. The obvious leverage for the student population will be a more formalized thesis process with much of the uncertainty removed and the appropriation of the coveted 'green card'. Finally, the transitional arrangement must be considered. It would be unrealistic to expect a seventh or eighth quarter student to abandon his or her thesis process so late in the game. Parallel processes may need to be in place during the transition.

The majority of computer systems projects that involve technological changes are developed and implemented to fit within existing organizations. The required investment in terms of structure, technology, people, and processes often halts a change in its tracks. The foundation for this CONOPS and the change management issues discussed is the integration of IT innovation with the process it supports. This CONOPS has first

identified the business process and then articulated the preliminary framework for the successful implementation of the NPS KP in an effort to innovate and improve the student thesis process. In the final chapter, we revisit innovation factors and conclude with recommendations.

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VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The student thesis research process at the Naval Postgraduate School is not well defined and is not well understood by many students. The authors of this thesis examined the discovery and sharing of knowledge and information and applied knowledge management concepts to innovate the thesis process. A knowledge management tool such as a knowledge portal can improve student thesis research but the processes behind the KP must also change for successful innovation to occur. The KP can provide a comprehensive collaboration mechanism that organizes, formalizes, and distributes information and knowledge. The KP cannot create nor can it apply or evolve knowledge for NPS. These steps must be undertaken by the organization as a whole. Students, faculty, and staff must be willing to share their knowledge and be shown incentives to do so. They must be able to see value in their sharing. They also must be able to share with relative ease so that they do not become frustrated in their efforts. The KP can provide an avenue for sharing, but its integration into the NPS thesis process must be carefully managed so that it will become a useful tool.

B. RECOMMENDATIONS

A number of innovations and recommendations are provided resulting from the analysis of the data collected. If the KP is to be successful in improving the student

thesis process, a number of changes must occur. First, the KP should be implemented as described in the CONOPS in Chapter V. Processes must be redesigned and databases created in conjunction with KP implementation. A pilot group of faculty and students should be used to evaluate the KP's initial performance with respect to the thesis process. User requirements should be revisited and refinements made before a second group of users is brought in. This iterative approach should continue until all users have been incorporated.

Second, resources should be iteratively incorporated into the KP as well. Robust, internal resources should be added first: the NPS Intranet (specifically the Research Office Web Page), the Focus database, and full-text theses and dissertations. Once developed, the student/faculty expertise database and the thesis clearing house of research topics should be incorporated. A chat room functionality or bulletin board with specified access privileges by user group could be added. This will enhance the capturing and sharing of tacit knowledge regarding the thesis process and other processes.

Finally, change management issues must be addressed. KP implementers and NPS leadership and management must be aware of the resistance to change in its many forms. Recognizing and minimizing the differences in the sub-cultures of the organization will be key. Lastly, a change management plan that identifies the key change agent(s) and outlines steps to managing the transition will be crucial.

C. ANSWERS TO RESEARCH QUESTIONS

1. How can the student thesis research process at NPS be innovated using KM processes, tools, and techniques?

NPS has realized the importance of the IT integration with the process that it supports. The School has taken the initial steps to implement the KP project as a knowledge management tool. The KP applies knowledge management innovation by helping to capture and share tacit knowledge. First, user requirements were gathered to ensure maximum effectiveness and utilization of the KP. Then, NPS started to re-engineer the process by utilizing IT such as web pages and the ETD procedure to make the process more streamlined and to organize, formalize and distribute knowledge and information. If NPS can take the correct steps to manage change and ensure an iterative, on-going operation, the KP project and innovation of the research process will be a success.

2. What is the current thesis process?

As previously mentioned, the current thesis process is not documented in a single reference and not well defined. Through interviews with students and faculty, we define five basic steps of the process:

- topic selection
- advisor selection
- thesis proposal submission
- research and writing thesis
- acquiring signatures and green card.

Completion of each of these steps requires a great deal of informal liaison and capturing of tacit knowledge by being in the right place at the right time. Students desire to have a more formal process available to them and additional IT tools to assist them in the thesis process.

3. How is knowledge discovered and shared in the thesis research process?

The primary mechanism for the discovery and sharing of knowledge in the thesis process is by word of mouth through person to person interaction. The peer network (student underground) and student-faculty discussions are vital for discovering and sharing knowledge of the thesis process.

4. What are the strengths and weaknesses associated with the current thesis process?

The strength of the thesis process is that although not formalized, information and knowledge is still shared through informal chats and liaisons. One of the weaknesses is that often times tacit knowledge goes untapped because it has not been captured, formalized, or distributed. Another major weakness is the lack of a comprehensive collaboration mechanism whereby students and faculty can internally share expertise and research areas with one another as well as externally share research areas with the Fleet. Other weaknesses that became evident via the focus groups include the lack of a 'thesis process timeline' and the inability to write a cross-departmental, cradle to grave thesis.

5. Are the weaknesses severe enough to warrant reengineering of the thesis process?

The weaknesses are severe enough to warrant some reengineering efforts. As discussed in this thesis, the organizational tacit knowledge is very difficult to capture. Nevertheless, it is often this tacit knowledge that is of great value to the whole organization and efforts should be made to capture, organize, and distribute it. Regularizing the student gouge by tacit knowledge capturing and sharing via a KP chat room or bulletin board feature is the first step to reengineering. Then, this captured knowledge can be formalized into an electronic manual and be continually shared with all students. If students find there is great value in using this manual and the KP features, this should enrich their tacit knowledge base and result in active involvement and personal commitment by most students. The other weaknesses mentioned warrant changes outside of IT innovation. They involve changes in organizational culture, so that 1) students are knowledgeable about the thesis process and 2) are not restricted by any barriers to crossing over to other departments and curricula to develop their thesis research.

6. How can the process be innovated to improve performance?

Several innovations can be incorporated to improve the thesis process. The KP becomes a tool to facilitate these innovations. First, allow students to approach the thesis as a team project, as topics allow. This collaboration gives real-world application to the thesis and allows students to take a process or problem from cradle to grave. Second, enhance NPS' reputation by advertising its capabilities. The KP can establish a better

connection among the Fleet, faculty, and student knowledge to facilitate sharing of problems, solutions, and potential research areas. Finally, use the KP as a mechanism whereby faculty and student expertise and research topic areas can be shared

7. What risks, impediments, or limitations must be addressed for process innovation to succeed?

The biggest challenge for successful process innovation is addressing the cultural differences and the knowledge sharing atmosphere of NPS. NPS must learn to minimize the differences between the academic way and the military mode of operating. NPS must also find a way to foster an atmosphere of sharing, trust, and benefit. Finally, NPS must overcome some of the technical challenges of creating and maintaining an expertise database and research area database that the KP can use to enhance collaboration.

8. Are the current thesis research topics relevant to Navy needs? If not, how might this be improved so that they become more relevant?

Some faculty, staff, and curriculum sponsors believe that more Navy-relevant theses need to be written. Others believe that student theses are generally relevant to Navy needs. Furthermore, stakeholders believe that not all theses have to be of high relevance. However, Navy-relevant theses can be increased and supported through the KP. As previously mentioned, a better connection to the Fleet via the KP whereby NPS has access to real Fleet problems is a step in the right direction.

9. How can the results of this study be applied to other knowledge-intensive processes and institutions?

Results of this study can be applied to the Navy-Marine Corps Intranet (NMCI) Portal project. We have learned a great deal from our thesis study that is directly applicable to the NMCI project development and implementation. For example, DON is a diverse organization, which is comprised of many subcultures, much like NPS. DON must understand the differences between the Navy, Marine Corps, and civilian personnel cultures and minimize these as possible in order to engender an atmosphere of trust, sharing, and benefit. If a knowledge-friendly culture is not fostered, the NMCI portal project is likely to fail. Our study's results can also be applied to distance learning and web-based education programs and is explored further in the following section.

D. RECOMMENDATIONS FOR FUTURE STUDY

Distance Learning (DL) and web-based education are important constructs of the NPS graduate studies program. The knowledge portal could be a useful tool to facilitate the development of a more robust DL capability. This area could most certainly be explored further as its impact is likely to go beyond NPS alone. DL and web-based education may be used in the future throughout the Navy. An example might be making pre-qualification courses for Enlisted "A" schools available via some sort of KP. DL may be used as part of the NPS graduate student program whereby students must complete certain courses online prior to coming to NPS. DL could shorten the time required

onboard NPS to complete a Master's program. A shortened NPS tour would be good for many students, as their careers cannot afford a great deal of time outside of one's warfare specialty. It would be good for the Navy, as it would increase the throughput of students to NPS as well as increase the number of officers with graduate education. The uses are endless; however, further studies must be conducted to establish user requirements in these types of scenarios, to integrate IT development with process reengineering, and to determine how a KP could be used to ensure maximum effectiveness.


As the KP project matures at NPS, a pilot KP study group will need to be set-up, conducted, and evaluated. As mentioned earlier an iterative process that is flexible is essential in any IT innovation. Students wishing to study the impact of innovation on an organization could pick up where this thesis leaves off by developing an implementation plan using feedback from the KP pilot user group. This follow-on study should include the criteria for the KP performance evaluation as well as any training required and refinements that need to be made. In addition, a follow-on study could incorporate a change management plan and the necessary transition that must occur for successful innovation.

The theory that IT must be integrated with the process it supports was used as a framework for our study. This thesis evaluated the student thesis process at NPS and found it could be innovated through a KM tool such as a KP. We have examined the knowledge needs of the NPS population, the thesis process in detail and the overriding culture of NPS that may impact successful innovation of the process. Innovative

recommendations are provided as well as follow-on courses of study. A KP can improve the thesis process if development and implementation is executed through this iterative, integrated approach.


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APPENDIX A. KNOWLEDGE PORTAL INTRODUCTION BRIEF




Naval Postgraduate School Knowledge Portal

Dr. Maxine Reneker
Navy Post Graduate School
Denise R. Duncan
Logistics Management Institute




Dudley Knox Library
Naval Postgraduate School



Agenda

- Introduction
- Portal Overview
- Discussion
- Adjournment



Dudley Knox Library
Naval Postgraduate School

Purpose

- Discover NPS requirements for NPS Knowledge Portal
- Discuss culture needed for knowledge sharing versus knowledge hoarding

LMI



Dudley Knox Library
Naval Postgraduate School

NPS Knowledge Portal

External

- More than 2000 E-Journals
 - Harvard Business Review
 - Wall Street Journal
- New Feeds
- Periscope
- ComputerSelect
- General Reference Sources
- Best Web Sites
- K-Store

Internal

- E-Mail
- Office files and documents
- Naval/DOD Publications
- Naval/DOD Databases
- Policy and Directives
- Navy/Marine Corps Library Catalogs

Collaboration

- Librarian Advisory Service
- People and Expertise Locator
- Communities of Practice
- Communities of Interest
- Content Contribution Tools

LMI



Dudley Knox Library
Naval Postgraduate School

Portal Integration-- DONCIO and NPS

- Both portal projects run in parallel:
 - Differences in user demographics, content focus
 - Leveraging strengths of both projects for the other:
 - NPS reference librarians will 'mine' for relevant web sites, provide some virtual librarians (advisory service)
 - DoNCIO provides bargaining power for licenses
 - Lab for portal-to-portal integration (N6, SPAWAR, etc.)



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APPENDIX B. LIST OF STAKEHOLDERS

Date	Time	Event	Players
Tuesday 1/18	1:00pm	Stakeholder Interview Dean Elster	NPS: Kathy, Maxine LMI: Denise
	1:00pm	Staff Focus Group: Curricular Officers	NPS: Julie LMI: Debbie
	3:00pm	Stakeholder Interview Capt Buschmann	NPS: Kathy, Maxine LMI: Denise
	3:00pm	Focus Group: Thesis Students I	NPS: Julie LMI: Debbie
Wednesday 1/19	8:00am	Stakeholder Interview Dean Panholtzer	NPS: Maxine LMI: Denise
	8:00am	Focus Group: PHD Students	NPS: Ann LMI: Debbie
	9:00 - 10:00am	Stakeholder Interview Dean Purdue	NPS: Maxine LMI: Denise
	10:00am	Staff Focus Group: NSMB Base Support	NPS: Ann LMI: Debbie
	1:00pm	Stakeholder Interview Dean Boger	NPS: Maxine, Julie LMI: Denise
	1:00pm	Focus Group: Faculty I	NPS: Kathy LMI: Debbie
	3:00pm	Stakeholder Interview Megan Reilly	NPS: Maxine, Julie LMI: Denise
	3:00pm	Focus Group: 2nd Quarter Students	NPS: Kathy LMI: Debbie
Thursday 1/20	8:00am	Stakeholder Interview Mary Aguilar	NPS: Maxine LMI: Denise
	8:00am	Focus Group: Other Staff	NPS: Greta LMI: Debbie
	10:00am	Stakeholder Interview Gil Howard	
	10:00am	Focus Group: Dept Chairs	NPS: Greta LMI: Debbie
	1:00pm	Stakeholder Interview Gary Roser	NPS: Maxine, Kathy LMI: Denise
	1:00pm	Focus Group: Thesis Students II	NPS: Julie LMI: Debbie

	3:00pm	Stakeholder Interview Dean Netzer	NPS: Maxine, Julie LMI: Denise
	3:00pm	Stakeholder Interview Julie Filizetti	NPS: Kathy LMI: Debbie
Friday 1/21	8:00am	Stakeholder Interview Capt Casey	NPS: Maxine, Julie LMI: Denise
	8:00am	Focus Group: Academic Staff I	NPS: Kathy LMI: Debbie
	10:00am	Stakeholder Interview Steve Lamar	NPS: Maxine, Julie LMI: Denise
	10:00am	Focus Group: Faculty III	NPS: Kathy LMI: Debbie
Tuesday 2/1	1:00pm	Focus Group: Faculty IV	NPS: Julie, Kathy
Wednesday 2/2	1:00pm	Focus Group: 2 nd Quarter Students II	NPS: Julie, Kathy
	3:00pm	Stakeholder Interview Tony Ciavarelli	NPS: Julie, Kathy
Thursday 2/3	11:00am	Stakeholder Interview Prof Jones	NPS: Maxine, Julie, Kathy
	1:00pm	Stakeholder Interview George Conner	NPS: Maxine, Julie, Kathy
Friday 2/4	8:30am	Stakeholder Interview Rueben Harris	NPS: Maxine Kathy
	10:00am	Focus Group: Academic Staff II	NPS: Julie, Ann
Monday 2/7	1:00pm	Stakeholder Interview CDR Markey	NPS: Maxine, Julie
Tuesday 2/8	8:00am	Stakeholder Interview Capt Hess/Hirsh	NPS: Maxine, Julie. Kathy
	1:00pm	Stakeholder Interview Chuck Cartwright	NPS: Maxine, Julie. Kathy
Wednesday 2/9	8:00am	Stakeholder Interview RADM Chaplin	NPS: Maxine, Julie. Kathy
	1:00pm	Dept Chair Interview T. McNelley	NPS: Maxine, Julie. Kathy
Thursday 2/10	7:30am	Stakeholder Interview Roy Williams	NPS: Julie
	1:00pm	Stakeholder Interview Cindy Graham	NPS: Maxine, Julie

APPENDIX C. INTERVIEW GUIDES FOR STAKEHOLDER

The Interview Guides were developed by NPS Library staff, the authors of this thesis, and a government contractor LMI. They were used to discover the information and knowledge needs of the NPS population.

Interview Guide – NPS Stakeholders

1. Have you heard of the NPS Knowledge Portal (KP) project?
2. If yes, clarify their understanding and ask: How will it help you do your job?
3. If no, then, describe the project and the content coverage of the KP. Make sure they understand the concept.
4. What information resources do you access regularly in your work?
Internal -
External -
5. Can you give me a quick (5 minutes or less) overview of how you, in your job, fit into this Knowledge Management (KM) system? Why is a knowledge-based system needed?
6. What are your most critical or important functions? Highest-impact decisions? How do you spend the majority of your work hours?
7. Can you name or describe the 'best' (most accurate, most targeted, most timely) information you could use to perform those critical functions?
8. What websites do you use most frequently? Why? What is your 'home' page (what comes up by default when the browser opens?) Why?
9. How do you research the information needed to do your job? How long does this take?
10. What do you do with that information? What information products are produced? Where do you send them?

11. Where do you get the research information? From whom or what system? What is it called (report name, etc.)?
12. With whom do you communicate most frequently?
13. With whom do you have your most crucial communications (phone, fax, email, face to face, scheduled and serendipitous)?
14. To what groups do you belong (IPTs, Committees, Task Forces, etc.)? How do you communicate with the group?
15. Are there ways you can suggest to incentivize information sharing on the NPS campus?
16. What would motivate you to use this knowledge portal (KP)?
17. What tasks would you like to be able to perform with the Knowledge Portal?
18. What info can you contribute to the KM system that will support others' business decisions?
19. Could NPS faculty research and student thesis topics be more attuned to the needs of the Navy? If so, how might this best be accomplished?

APPENDIX D. INTERVIEW GUIDES FOR FOCUS GROUPS

The Interview Guides were developed by NPS Library staff, the authors of this thesis, and a government contractor LMI. They were used to discover the information and knowledge needs of the NPS population. Each set of questions was tailored for a specific group: students, faculty (teaching and research), and support staff.

Interview Guide—Students (focus groups)

1. Before you came to NPS, what information did you need about NPS and your stay here?
2. How did you find it?
3. Once you arrived, what information did you need:
 - To prepare for your classes and generally succeed academically?
 - To have a good quality of life?
 - To conduct your thesis?
 - For other purposes?
4. What are the difficulties you encounter while trying to get the information you need?
5. From which people do you get information, informally or formally? How?
6. Do you use any 'workarounds', because you can't get the information you need easily or timely?
7. Do you have a thesis research/topic area? How did you acquire it?
8. How did/will you go about finding a thesis advisor?
9. Do you belong to any 'communities' (peer groups, list-servers, discussion groups), electronic or otherwise?
10. Are there ways you can suggest to incentivize information sharing on the NPS campus? What would motivate you to use this knowledge portal (KP)?

11. How do you think greater information sharing could help NPS (at the both personal level and organization and corporate levels)?
12. What tools do you use to share knowledge? How could they help you personally and NPS as a whole?
13. What would you like to get from an NPS KP? (What info sources should it contain? How should it increase knowledge sharing at NPS?)
14. When you leave NPS, how do you think NPS could help you? What information could NPS provide to you?
15. Are there any information resources that you use regularly that have not come up in this discussion? Any other information requirements?

Interview Guide – Staff (focus groups)

1. In your job here at NPS, what information do you require?
2. How do you get that information?
3. What are the difficulties you encounter while trying to get the information you need?
4. Do you use any 'workarounds', because you can't get the information you need easily or timely?
5. From which people do you get information, informally or formally? How?
6. Would you like to have more interaction with the student population - - specifically dealing with thesis/research areas? Why or why not?
7. What aspects of your job would be useful to a student looking for a research area/topic?
8. Do you belong to any 'communities' (peer groups, list-servers, discussion groups), electronic or otherwise?
9. Are there ways you can suggest to incentivize information sharing on the NPS campus?

10. What would motivate you to use this knowledge portal (KP)?
11. How do you think greater information sharing could help NPS (both at the personal level and organization and corporate levels)?
12. What tools do you use to share knowledge? How could they help you personally and NPS as a whole?
13. What are your most valuable information resources, tools and services here at NPS? Why?
14. What would you like to get from an NPS-KP? (What info sources should it contain? How should it increase knowledge sharing at NPS?)
15. What other concerns do you have that haven't been raised during this discussion?

Interview Guide – Faculty (focus groups)

Research

1. How do you stay aware of current developments in your field?
2. How do you fulfill your research-related information needs?
3. What difficulties do you have in getting this information?
4. What information resources, tools, and services do you value most for this research? Why?

Instruction

1. How do you fulfill your information needs for course development?
2. What difficulties do you have in getting this information?
3. What information resources, tools, and services that support teaching do you value most? Why?

General

1. Do you use any 'workarounds', because you can't get the information you need easily or timely?
2. From which people do you get information, informally or formally? How?
3. Do you belong to any 'communities' (peer groups, list-servers, discussion groups), electronic or otherwise?
4. Are there ways you can suggest to incentivize information sharing on the NPS campus?
5. What would motivate you to use this knowledge portal (KP)?
6. How do you think greater information sharing could help NPS (both at the personal level and organization and corporate levels)?
7. What tools do you use to share knowledge? How could they help you personally and NPS as a whole?
8. What are your most valuable information resources, tools and services here at NPS? Why?
9. What would you like to get from an NPS KP? (What info sources should it contain? How should it increase knowledge sharing at NPS?)
10. What information skills are necessary for students to successfully complete your curricula? Why are they important?
11. In general, do your students have these skills? Can you give an estimate (%) of how many are lacking in these skills? Can you perceive any patterns in students' information skills, or lack thereof? How might their lack of skills be addressed?
12. How do you get thesis topics/research information out to NPS students?
13. How do you obtain Navy/Fleet information that may be relevant to future thesis topics or research areas?

14. What Navy-specific information sources do you use? Other military sources? For what purposes?
15. What information-related difficulties do you think students have, that has not yet come up in this discussion?
16. What other concerns do you have that haven't been raised during this discussion?

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APPENDIX E. LIST OF INFORMATION AND KNOWLEDGE RESOURCES

The below table was compiled from the user requirement interviews of the NPS population. It represents all the information and knowledge resources that were identified by the focus group or stakeholder. The table displays who identified the resource, the name and description of the resource, and whether the resource is internal or external to NPS. The Comment column states issues and potential problems with the identified resource. This is a comprehensive list of all the resources that were identified during the user requirement interviews

NPS KNOWLEDGE PORTAL RESOURCES

Focus Group	Resource	Description	Internal/ External	Comments
F13		CDC, home care providers MWR Website?	I	Check MWR Web page
F3 PHD Group		Text Books, Suppliers, Equipment	E	Need access to supplier info and hot deals on equipment
F6 1/19 1500 Students		Online papers published by NPS faculty, Opinion papers	I	Doesn't exist, wishlist
F6 1/19 1500 Students		Course Info / Scheduling	I	Determine class availability online, pre-registration via web, required courses, books Curric offices printout, available via ? system, on campus
F6 1/19 1500 Students		Thesis Topics	I	Doesn't exist, wishlist

Focus Group	Resource	Description	Internal/ External	Comments
F7 Other Staff		Patent Info	E	
F9 1/20 1300 Thesis Students		On-line listing of available classes	I	Maintain connection with Fleet Check
S1		Strategic info from Capitol Hill and Pentagon	E	
S1 01 Dean Elster		Historical info on people and budget; benchmarking data	I	For trend analysis Doesn't exist?
S1		Teaching evaluation data	I	Trend lines by class and instructor SOFTs filled out, registrar has?
S10		Faculty Skills Db and on- going research	I	Doesn't exist, wishlist
S11		Tuition assistance info	E	May be available via Navy website, TA is a Navy program (BUPERS, VA etc)
S11		Thesis info	I	Abstracts? Via ?
S11		Officer student demographic into	I	Focus may or may not do this Check with registrar
S12		Commercial Airline Mishap DB	E	
S12		Academic survey data from Tony Civarelli	I	Professor scores from Student Survey Check with Tony
S14 Tony Civarelli		Innovations in administration	E	
S14		Trends in safety and human factors	E	
S15		N6 curric review info	E	
S15		OO input meeting – background info	I	Wish list
S16 George Connor		Navy DB - ?	E	Specifics?
S16		Navy Personnel Data System	E	Access thru DMDC databases?

Focus Group	Resource	Description	Internal/ External	Comments
S16		Faculty management and best business practices	I	Wish list
S16		NPS internal management info	I	Wish list
S16		Gil Howard's DB	I	?Check with Gil
S18 CDR Markey		Contract Law Info	E	
S19		DON Officer demographic Info	E	
S19		Special Request tracking system	I	Exists?
S24 Cindy Graham		Immigration Info	E	May be available via INS web page
S24		Legal info -- city and state info?	E	
S24		Info on PFP and NATO	E	
S24		International Handbooks	I	Hardcopy available only and out of date
S3		NPS Satellite Office Info (Annapolis)	E	Might be available via satellite web page if exists
S3		Thesis info specifically from Space Group including abstracts, names advisors	I	Available via Library Services?
S3		Experience Tour DB	I	Exists?
S3		Stores?	I	
S4		DOD phonebook, with exec info with links to bio info	E	Exists on Web pages?
S4		Faculty Data (yrs to tenure eligible)	I	Wishlist
S4		Lab plan - update, latest version	I	Exists?
S8		Distributed Learning Info	E	
S9		Local Monterey Business	E	
S9		Curricula Development Info	I	
F1 1/18 - 1300 Curric Officers	AAFTA	Outside Military Resources	E	Means?
S4	AASHE	?	E	
S15	AboutBlank		E	

Focus Group	Resource	Description	Internal/ External	Comments
S12	Academic Leader	Bimonthly Newsletter	E	Lib has subscrip?
S5	ACM	?	E	
F14	Alumni DB	Alumni addresses	I	23K records back to FISO?
S9	Alumni DB		I	Via alum office
S14	Amazon.com		E	
F6 Second Year Students 1500	ATIS Library System	Ship Manuals, Propulsion Manuals Index of CDs	E	Available via Library?
F13	BUPERS Web Page	Comprehensive Web page on Navy Milpers matters	E	
F4 1/19 10:00 NSAMB	BUPERS web page		E	
S14	Business Edition of Electronic Lib		E	
S12	Business Weekly		E	Lib has subscrip?
S23	CAD	PW program- engineer program	I	
S11	Calendar	Admiral daily calendar	I	On intranet
S3	Calendar /Appointment	Personal calendar available as well as 00 calendar via intranet	I	
S4	Calendar of Events		I	
S7	Calendar of Events		I	
S11	CAN	?	E	
F14	CASE list service	Spell out	E	
S23	CBD	PW program? Holds bldg contracts	I	
S6 Reilly	CD TEMS		E	
S12	Chronicle of Higher Ed		E	

Focus Group	Resource	Description	Internal/ External	Comments
S4	Chronicle of Higher Ed		E	
S8	Chronicle of Higher Ed		E	
S1	Chronicle of Higher Learning	Newspaper?	E	
S7	Civilian Orientation handbooks	DONwide or NPS	E	
F12	CLA	???	E	
F9 1/20 1300 Thesis Students	CNMOC News Professional Mags	DOD, Navy, Civilian, Academic	E	
S21	CNN		E	
F12 2/1 1300 Faculty	CNN News Feed	Free resource?	E	
S5	Comp Sci Tech Reports Lib		E	
S5	Computer Research Assoc.		E	
F11 1/21 1000 Faculty	Conferences Proceedings	Computer Science	E	Journals not as useful to Computer Science as there is a 6 month turnaround not several years before info is obsolete. Need Technical Proceedings.
S16	Corporate University collaboration	?	E	
S7	Correspondence Manual	DON wide or NPS?	E	Available on Web?
S7	Cyber Feds		E	?
S11	Defense Link	Via Internet	E	
S4	Defense Link		E	

Focus Group	Resource	Description	Internal/ External	Comments
S22	Department Thesis Notebook	Mech Eng. Hardcopy and online resource	I	Different Departments have this
F3 PHD Group	Department Web Site(s) Online Course Catalog	Department Web Site(s) with courses and prerequisites / Research Topics	I	Fairly accurate and up to date.
F3 PHD Group	Department Web sites	Distribute course materials to students	I	Course work on line, class notes, text books especially out of print
F6 Second Year Students 1500	Departmental Web Pages	Class information	I	Matrix by curriculum
F11 1/21 1000 Faculty	Departmental Web sites	Distribute Course Materials to Web	I	Easier for International Students to get info. Students stay plugged in. Two way street with email.
F3 PHD Group	Departmental Web sites	Source of Curriculum Info	I	DOD Policy shut down many web sites needed by students
S17	Dept Newsletter	IT department	I	Hardcopy sent out?
F4 1/19 10:00 NSAMB	DERS Dependent Eligibility Reporting System	Dependent Eligibility Reporting System	E	Available at Personnel Support Detachment
S20	DFAS payroll system		E	Link to DFAS system?
F7 Other Staff	Distance Learnine	Web Based Classes available at NPS	I	Available via NPS academics webpg and Office of Inst web page
S15 Carl Jones	Distance Learning	Web-enhanced courses ISO distance learning	I	Available via NPS/academics and office of instruction web page exists yet?
S7	DOD and USN Regs		E	Available on Web?

Focus Group	Resource	Description	Internal/ External	Comments
S4	DOD Instructions	Via Web?	E	
F4 1/19 10:00 NSAMB	DOD Page	Claimant Instruction	E	Nothing specific, via Internet
F4 1/19 10:00 NSAMB	DOD Personnel Database	Phone #s of DOD personnel	E	Available via Navy Whitepages
F14	DORS	Comptroller DB, budget info	I	Accessible?
F4 1/19 10:00 NSAMB	DORS	Financial Data	I	Dept level financial data. Accessible by professors. Not fully deployed. Comptroller developing online job order.
S10	DORS		I	
S12	DORS	Financial Data	I	
S4	DORS	Budget data, work load spreadsheet by department	I	
S6	DORS		I	
S8 Code 011 Gil Howard	DORS	Financial Info, Faculty work years and \$, budget info	I	
S9	DORS	Comptroller Info	I	
F12	DORS /Comptroller Info	Specific Info: Travel, Direct Labor, Reimbursable and outstanding orders	I	Maybe other DB besides DORS depends on user and profiles
S13 Steve Lamar	DORS Annual Budget Report		I	In PDF format
S20	DORS data warehouse		E	
S16	DORS/	Financial DB	I	
S5	DORS/	Comptroller Budget Info	I	
F4 1/19 10:00 NSAMB	DORS/Comptr oller	Specifically :Biweekly reports from payroll system	I	
S1	DORS/Comptr oller DB		I	Financial trails and budgetary projections

Focus Group	Resource	Description	Internal/ External	Comments
F4 1/19 10:00 NSAMB	DTIC	Thesis abstracts on-line. DOD Database	E	Must pay to get full thesis.
F13	Early Bird	Breaks down military news from worldwide sources	E	May only be available to .mil domains
F4 1/19 10:00 NSAMB	Early Bird	News clipping service	E	
F6 1/19 1500 Students	Early Bird	News clipping service	E	
S1	Early Bird		E	
S1	Early Bird		E	
S16	Early Bird		E	
S2 00A Capt Buschmann	Early Bird		E	
S3	Early Bird		E	
S8	Early Bird		E	
S7	EEOC	?	E	
S21	Electronic Suggestion box		I	Available via intranet
F10 1/21 0800	Employee Info	EEO/Safety, Employee HRO, Federal Employees	I	Centralized POCs / Originators Exists?
S9	ESL	Workshop	I	
S20	ETAC		I	
S23	ETAC	Timecard program?	I	Belongs to HRO? Accessible via intranet? Or on LAN?
S3	ETAC		I	
S6	ETAC		I	
S6	Express purchase		I	
S10	FAR	?	E	
S20	FASTData		I	Comptroller DB
S6	FASTDATA		I	
S7	FastTrack Field Advisory Srcvs		E	

Focus Group	Resource	Description	Internal/ External	Comments
F14	Federal Technology Transfer Newsletter	Paid or free?	E	
S11	FFRDC	?	E	
S9	Field Trip Info	Americana?	E	As in Travel Guide?
S12	Flight Safety Foundation		E	Via Web?
S20 Cartwright	FMR	Dod/OSD Comptroller Policies	E	
F4 1/19 10:00 NSAMB	FMR Reg on-line	Financial Info	E	
S11	Focus	Registrar info, Officer master files	I	
S16	Focus		I	
S19 CAPTS Hess and Hirsch: Dean of Students	Focus		I	
S3	Focus	Student Info, registration info	I	
S5	FOCUS	Student trend Data	I	System cannot do this
S6	Focus	Registrar DB	I	
S8	Focus	Registrar Info	I	
S9	FOCUS		I	
F1 1/18 - 1300 Curric Officers	Focus Database	Personnel Data	I	Old. Can not be used. Looking at replacing it.
F12	Focus DB	Student DB used by Registrar	I	Difficult to use, currently not a shared resource. Supposedly going to be upgraded to another system purchased by Registrar
S9 Gary Roser	Focus DB	Data on International students	I	
F7 Other Staff	Focus to SQL database	NPS Phone Book	I	

Focus Group	Resource	Description	Internal/ External	Comments
F4 1/19 10:00 NSAMB	Foreign Policy Research Institute		E	
F4 1/19 10:00 NSAMB	GCCS	Fleet Info Database	E	Tells you what Fleet is doing Available via classified labs on campus
F4 1/19 10:00 NSAMB	GCOS database	Global C2 system	E	Same as GCCS?
S21	GERB	?	E	
S11	Gil Howards DB		I	What is it?
F6 1/19 1500 Students	Government Databases		E	No specifics Have to hunt for them Might mean gov web pages
F13 2/2 1300 2nd Q Students	Housing Info	Housing Web page available	I	
S8	HRO	Personnel Info	I	Available to ? , manager use online or hardcopy printouts?
S1	HRO DB	Personnel info, civilian employee data sorted by dept	I	
S16	HRO DB	Specific name?	I	
S20	HRO DB	Personnel Info	I	HRO system,
S5	HRO DB	Faculty #s and salary by discipline	I	
S7	HRO DB	Activity Manning docs via Navy Data System	I	
S11	HRO/Defense Manpower Data Center	At Fort Ord,	E	Does HRO have access to this?
S7	HRO/Defense Prsnl Mgmt Service		E	

Focus Group	Resource	Description	Internal/ External	Comments
F13	IEEE	Standards	E	Lib pays for resource, not available from desktop. CD rom available thru resource desk.?
F6 Second Year Students 1500	IEEE	External availability to intranet	E	
S3	IEEE	Via Lib Services	E	
S5	IEEE		E	
F5 1/19 1300 Faculty I	IEEE Database	Provides on-line retrieval services	E	Number 1 central Physics Db Like to have NPS subscription so that personal subscription can be dropped.
F3 PHD Group	IEEE on web		E	
S12	Info Week		E	Lib has subscrip?
S4 Dean Purdue	INFORMS		E	
S9	INS Regs and PIMS	?	E	Via Web page?
S9	International Handbook	Hardcopy only; online?	I	
F14	Internet	WEB access	E	
S1	Internet	Office of Legislative Affairs	E	
S10 Code 09 Dean Netzer	Internet	DOD, DON homepages; SBIR	E	
S10	Internet	DOD ONR, DARPA, OPNAV 091	E	
S11 Julie Filazetti	Internet	Specifically DOD and DON web sites, RAND Corp, BUPERS, SCUP; Defense Link; AIR; WASC; CNO N46; NPRST	E	
S12 Capt Casey Aviation Safety	Internet	Aviation Safety Center, Ntl Aviation Center, BUPERS, CNO	E	

Focus Group	Resource	Description	Internal/ External	Comments
S13	Internet	Bureau of Med and Surgery Web page and Air Command and Staff College	E	
S14	Internet	NASA Web site, Berkley, U of SF	E	
S15	Internet	Legislative info	E	
S16	Internet		E	Web site for policy and performance measures
S20	Internet	DFAS web page, ASN web page	E	
S21	Internet	Flagnet Homepage, BUPERS	E	
S22	Internet	Connections to NSWC China Lake, NSWC Cardrock, NAVSEA, Natl Science Foundation	E	
S24	Internet	Sec Asst NW (SAN) DOD site; www.monterey.com for local monterey info	E	
S4	Internet	Airline Homepages; the Trip.com: airline tracking; JTR (Jt Travel Regs?)	E	
S4	Internet	Specifically U of MI site for access to Title V and VII of US code, Sherlock meta search engine; MIT; NDU	E	
S7	Internet	DASN for HR and EEO web site, OPM, BUPERS, MSPB, Fed Force, Soc. Of Human Resources Managers, Career Connection	E	
S8	Internet	Dept of Ed, ASSN of Institutional Research	E	
S9	Internet	Embassies, CNET, OPNAV 735, State Dept, Def Sec cooperation Agency, DLI English Lang Training Center	E	
S24	Internet/NETS AFE	Asst Manager located in Pensacola	E	
S5	Internet/Web	Google, NorthernLight	E	

Focus Group	Resource	Description	Internal/ External	Comments
S6	Internet/Web		E	Specific access to Navy Budget Page and Congressional appropriations and PBD Updates
S12	Intl Council of Aviation Org		E	Via Web?
S19	Intranet	Dean of Students Web page	I	
S21	Intranet		I	
S8	IPEDs	Integrated Post Secondary Ed data System	E	
S6	ISSA agreement info	Available via intranet?	I	
S12	Janes	Platform	E	Library has subscription?
S8	Legislative Affairs		E	
F6 Second Year Students 1500	Lexis Nexus		E	
F11 1/21 1000 Faculty	Lexis/Nexus Phibes	Data	E	
F7 Other Staff	Library Database	Library Info	I	Via Library Web page
F3 PHD Group	Library Databases		E	
F4 1/19 10:00 NSAMB	Library Databases	JE Library DB, L/N DB, DOD Library Consortium	E	
F6 Second Year Students 1500	Library Databases		E	Specifics?
F8 1/20 1000 Department Chairs	Library Databases		E	Excellent support from Library. Find obscure articles

Focus Group	Resource	Description	Internal/ External	Comments
F9 1/20 1300 Thesis Students	Library Databases	NPS Library Services, Research Tools	E	
F12	Library DB	Online Services including Bolson, L/N, IEEE and mil standards, ACM3 articles?	I	
F7 Other Staff	Library of Congress	Fed Law, Congressional Library	E	
S14	Library Online Services		E	
F4 1/19 10:00 NSAMB	LINK Magazine	Personnel Issues/ Perspective	E	
F3 PHD Group	Links to Officer Community in the Fleet		E	Available via Web, via Bupers Web page
F12	List of NPS Internal licenced software	Available?	I	
F3 PHD Group	Local Demographic Information / Base Info	Housing, Schools	E	
F6 1/19 1500 Students	Local Demographic Information / Base Info	Avg. Utility Costs, Housing, Schools	E	Need information on local area. For example, \$30 –60 to register cars on base. Local Laws/Regs, Housing Info
F6 Second Year Students 1500	Local Demographic Information / Base Info	Schools, Housing, Dress Code, Registration Hours	I	Via web page
F4 1/19 10:00 NSAMB	Management Information System MWR	Navy Wide initiative	E	Fielded in 2-3 years
F4 1/19 10:00 NSAMB	Manufacturer's catalogs	Online catalogs such as HP etc.	E	

Focus Group	Resource	Description	Internal/ External	Comments
F6 Second Year Students 1500	Marconi		E	
F6 Second Year Students 1500	Marine Core Thesis Site	Thesis Information	I	Not updated in years. Everyone should participate
F12	Maximo	Public Works DB used for project tracking, costs, etc. Ties into budget, supply and timecards	I	
F4 1/19 10:00 NSAMB	MAXIMO	Automated Master Plan. GIS Geographic Information System. Facilities Questions, Lab Plans, Classroom Plan	I	CML - partial funding to be released in a year.
S23	Maximo	PW program	I	May be useful to entire campus
S23 Roy Williams	MEANS program	PW program that give estimates of cost for labor and material	I	Belongs to PW or comptroller?
S13	Medical Info		E	Tricare info
S24	Medical Info	Local NPS area info available via POM web page?	E	
S24	Medical Info	Military POM and local doctors	E	
S9	Medical Info	DOD and Local Area	E	
F3 PHD Group	Medical Information	Information on Doctors, Services Covered etc	E	
F6 Second Year Students 1500	Medical Information	TriCare Doctors/ Specialists	E	Book is out of date
F13	Medical/Tricar e	Area as well as specific military information	E	Available via POM Army Web site?
S13	Medline		E	Web?
S7	MODERN	HRSC in San diego	E	Oracle Based replacing PPI
S6	Monarch		I	

Focus Group	Resource	Description	Internal/ External	Comments
F13 2/2 1300 2nd Q Students	Monterey Area Information	Specifically Schools: Maps; Kennels	E	City and Chamber of Commerce may have web page. School district web page?
F4 1/19 10:00 NSAMB	MWR	Developing a web site	I	
S9	MWR		I	Specifics?
S8	NACUBO		E	
S15	NACUBO/WA CUBO	?	E	
F14	Nat' Council of University Research Administrator List Service	NCURA	E	
F8 1/20 1000 Department Chairs	National Ocean Partnership Program	Web site for ocean meteorology. Created by ex Navy Admiral Watkins.	E	Important to oceanography
S10	Naval Science Assit Program		E	
S6	Naval Studies Research Reports	CAW? IDA? CSIS	E	
F4 1/19 10:00 NSAMB	NAVCOMP Manual	Financial Info	E	
F11 1/21 1000 Faculty	Navy Databases	CD ROMS – classified. Models – predictive Fleet models based on database	E	
F4 1/19 10:00 NSAMB	Navy Exchange	NEX Central Web Site	I	Navy Exchange would like to provide information – no connection to base.

Focus Group	Resource	Description	Internal/ External	Comments
F7 Other Staff	Navy Message, Fed Week, Fed Tech, Search Engine News, Training Sites, Web Developer one		E	
S2	Navy Messages	Via NPS MDS comes in on Outlook program	I	
S19	Navy Regs, Jt Travel Regs	Available Via Web, Bupers Homepage and other pages?	E	
F12	Navy Technical Reports via Navy Labs and Warfare Centers	Available in specific libraries at these commands but online?	E	
S8	NCES DB	?	E	
S8	NCHES	?	E	
F8 1/20 1000 Department Chairs	Netseminar.co m	On-line Seminar Provides list of seminars	E	
F4 1/19 10:00 NSAMB	NIMA Terrain DB	High end geographical database	E	Restricted? Classified?
S21 Adm Chaplin	NPS Board of Advisors	? Mins, Web meeting?	I	
F11 1/21 1000 Faculty	NPS Calendar	Calendar of Events Ability to add new items to schedule (ex. Mine Warfare Seminar)	I	Available via Intranet?
F7 Other Staff	NPS Calendar	Events Calendar Classroom, Lab scheduling Calendar	I	
F12	NPS events	Calendar program available via Intranet only?	I	

Focus Group	Resource	Description	Internal/ External	Comments
F13	NPS General Catalog	Describes curricula, courses, etc	I	Available on line via NPS Web page/academics and office of instruction web page
F6 Second Year Students 1500	NPS General Catalog	Course Catalog from Registrar Office	I	
F6 Second Year Students 1500	NPS General Catalog	Bluebook Information, Curriculum and Schedules	I	
S13	NPS General Catalog		I	Course information
S22	NPS General Catalog	Course Info	I	
S3	NPS General Catalog	Course Info	I	
S4	NPS General Catalog	Specific:Matrix of Courses,	I	
S8	NPS General Catalog	Curricula Info	I	
S9	NPS General Catalog		I	
F6 1/19 1500 Students	NPS Instructions	NPS Guidelines Code of Ethics	I	Exist on line, check with Code?
S12	NPS Instructions		I	
S4	NPS Instructions and Directives		I	
F14	NPS Instructions and Notices	Available Online?	I	
S7 Code 022 Mary Aguliar	NPS Instructions and org charts	Faculty policies and procedures	I	Avail on Web page/intranet?
F14	NPS Intranet		I	

Focus Group	Resource	Description	Internal/ External	Comments
F6 Second Year Students 1500	NPS Intranet	Bulletin Board Pose Questions/Others respond	I	
S11	NPS Intranet		I	
S3 Code 07 Dean Panholtzer	NPS Intranet		I	
S5 Dean Boger	NPS Intranet		I	
S7	NPS Intranet/ Daily Announcement s		I	
S14	NPS Library	Bosn	I	
S21	NPS Library Web page	Including Bolson	I	
S10	NPS Meeting Notes	Budget committee, Deans and Chairs, Academic Groups	I	
S2	NPS Meeting Notes	Input meeting, Planning Board, ESC	I	
F12	NPS Minor Property		I	
S7	NPS Org Chart	Available on Web pg?	I	
F10 1/21 0800	NPS Phone Book	Yellow Pages	I	
F4 1/19 10:00 NSAMB	NPS Phone Book	Phone # of NPS personnel	I	
F14	NPS Phonebook	Available via Outlook? or another source	I	
S4	NPS Phonebook		I	
F12 2/1 1300 Faculty	NPS Presentations	Dept Briefings, talks, speaker schedule, more of a calender of events	I	The event calendar is on line intranet, but very few used
F1 1/18 - 1300 Curric Officers	NRL	Outside Military Resources	E	

Focus Group	Resource	Description	Internal/ External	Comments
F11 1/21 1000 Faculty	NSA	Books, Academic Articles	E	
F3 PHD Group	NSF	Funding Source Information	E	PHD students with funding – more attractive to potential faculty
S14	NTSB	?	E	
S3	On-line Magazines	Spectrum Magazine, Aerospace America, Ferroelectricity Newsletter	E	
S1	Online Newspapers		E	Not specific
S22 Prof. McNelley	Online subscriptions	Specifically: Materials and Metals; Acta Materiola, Scripta Materiola	E	
F3 PHD Group	Online Technical Journals	Optics, Electronics – Journals not available in Library	E	
F13	Online Thesis	Full-text availability from Intranet and via Lib Web page	I	Abstracts are currently available, full-text being work on via another project
F14 2/4 1000 Other Faculty	Online- thesis	Only abstracts are available	I	
F8 1/20 1000 Department Chairs	ONR – funded to create Virtual Poster Session	Virtual Conferences	E	
S16	OPCAL	U of CA	E	
S12	OPNAV Instructions		E	Specifically 3750
S5	OSD C3I DB	Architecture, Defn, Policies and guidance	E	
F12	Other Military Web sites		E	Some only available to .mil domains

Focus Group	Resource	Description	Internal/ External	Comments
F11 1/21 1000 Faculty	Other Services	Foreign Military, Army, Air Force etc Germany, England	E	
F8 1/20 1000 Department Chairs	Other Services	Foreign Military, Army, Air Force etc.	E	
F3 PHD Group	Other Universities	Links to Stanford, MIT etc	E	
F10 1/21 0800	Outlook	Bulletin Board Email	I	
F14 2/4, 1000 Other Staff	Outlook	Email tool	I	
S11	Outlook	Specific folders for collaboration	I	
S12	Outlook		I	
S19	Outlook		I	
S3	OUTLOOK	Email	I	
S6	Outlook	NPS email system	I	
F4 1/19 10:00 NSAMB	Outlook Address book	MS Outlook address book	I	
F12	Outlook/Email	Obvious choice for KP	I	
S14	Outlook/Email		I	
S2	Outlook/Email		I	
S7	Outlook/email		I	
F3 PHD Group	PAO, Research Newsletter	Vehicle to publish work	E	
S18	Point Cast		E	
F10 1/21 0800	Procurement Databases	Vendors/Prices on-line	E	
F11 1/21 1000 Faculty	Professional Journals		E	Upcoming seminars & conferences

Focus Group	Resource	Description	Internal/ External	Comments
F8 1/20 1000 Department Chairs	Professional Journals		E	
F4 1/19 10:00 NSAMB	Prosite Lexis Nexus		E	Question ability to duplicate / copyright laws for articles
S9	PSD	Personnel Support Detachment	E	Specifics?
F1 1/18 - 1300 Curric Officers	RAND	Outside Military Resources	E	
F6 Second Year Students 1500	RAND		E	
F3 PHD Group	Research Databases	DOD and non-DOD	I/E	
S22	S &E Compendium		E	?
S12	Safety Center Data	From USAF, USMC, USN, NASA, FAA	E	
S6	SEI		E	
F4 1/19 10:00 NSAMB	S-FOR K-FOR	Peacekeeping Ops Public Web site	E	

Focus Group	Resource	Description	Internal/ External	Comments
F8 1/20 1000 Department Chairs	Small Business Innovative Research Program (SBIR)	Web site http://www.sba.gov/hotlist/sbir.html	E	Helpful in finding research topics Provides links to Community of Science DoD SBIR/STTR Program Inventions & Innovation Program Intellectual Property Protection Jet Propulsion Lab Technology Transfer Jade Research SBIR/STTR News and Tools Manufacturing and Processing National Technical Information Service (FEDWORLD) NIST -- Manufacturing Extension Partnership Information National Technology Transfer Center National Library of Medicine - Grants/Contracts SBIR Conferences Homepage SBIR Contracts/Grants: Army SBIR etc.
F6 Second Year Students 1500	SPAWAR	Research Topics	E	
S7	SPEAR	Strat Planning, Ed assess and Inst Research	E	

Focus Group	Resource	Description	Internal/ External	Comments
S20	STARS		I	
F1 1/18 - 1300 Curric Officers	Student Info	Personal Info, Schedules, Demographics	I	Student Info Curric Officers already have. Need schedules, personal info and demographics. Ad hoc query doesn't have everything needed. Doesn't exist digitally, except via Focus and separately now on electronic schedule available on campus via ?
S3	TECHLISA	Foxpro DB from Def Civ Personnel	E	
F14	Telephone book	Hardcopy only, online version is not available, last printed in 1997	I	
	Text Book Publishers Text Book Lists	List of books and publishers	I/E	Need text book lists from faculty and current list of publishers
S12	The Standard		E	Lib has subscrip?
S12	The Teacher		E	Lib has subscrip?
S16	Thesis Abstracts		I	
S5	Thesis Abstracts		I	
F13	Thesis Handbook and Template	Describes thesis process? And give templates	I	Available via Dean of Students web page-
S12	Travel Manager		I	
S3	Travel Manager	Maybe available via intranet	I	
S6	Travel manager		I	
S9	Travel Manager		I	

Focus Group	Resource	Description	Internal/ External	Comments
F11 1/21 1000 Faculty	Wired		E	Monitor Wired for technology trends
S20	XP	?	E	

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APPENDIX F. NVIVO NODE LISTING

The Node Listing is a tree diagram that allows the qualitative researcher to organize categories and subcategories of data. NVivo allows this node-coding scheme to be setup and then revised as needed. The authors of this thesis used nodes that would assist them in answering the main questions of this research.

NVivo revision 1.0.118

Project: Thesis I

Date: 8/5/00 - 10:03:08 AM

NODE LISTING

Nodes in Set: Thesis Project Nodes

Created: 6/23/00 - 10:31:33 AM

Modified: 7/13/00 - 12:52:08 PM

Number of Nodes: 84

- 1 Hoarding
- 2 Knowledge
- 3 Knowledge Discovery
- 4 Navy Relevancy
- 5 Process Innovation
- 6 Process Problems
- 7 Sharing
- 8 Knowledge Management
- 9 (1) /Sources of thesis information
- 10 (1 6) /Sources of thesis information/Web Pages
- 11 (1 1) /Sources of thesis information/Formal Student
- 12 (1 2) /Sources of thesis information/NPS Professor
- 13 (1 3) /Sources of thesis information/Sponsor
- 14 (1 4) /Sources of thesis information/Curricular Office
- 15 (1 5) /Sources of thesis information/Printed Information
- 16 (1 7) /Sources of thesis information/Library
- 17 (1 8) /Sources of thesis information/Research Office
- 18 (1 9) /Sources of thesis information/Seminars
- 19 (1 10) /Sources of thesis information/Professional Societies-
Industry
- 20 (1 11) /Sources of thesis information/Databases

21	(1 5 1) /Sources of thesis information/Printed Information/Welcome Aboard Packages
22	(1 5 2) /Sources of thesis information/Printed Information/Student Catalog
23	(1 5 3) /Sources of thesis information/Printed Information/Thesis Manual
24	(1 5 4) /Sources of thesis information/Printed Information/Dept Research Newsletter
25	(1 5 5) /Sources of thesis information/Printed Information/Bulletin Boards
26	(1 5 6) /Sources of thesis information/Printed Information/Presentations
27	(1 11 1) /Sources of thesis information/Databases/Lexus-Nexus
28	(1 11 2) /Sources of thesis information/Databases/Bosun
29	(1 6 1) /Sources of thesis information/Web Pages/NPS Web Page
30	(1 6 2) /Sources of thesis information/Web Pages/Dept-Curric Web Page
31	(2) /Knowledge of Thesis Process
32	(2 1) /Knowledge of Thesis Process/Unaware of process
33	(2 2) /Knowledge of Thesis Process/Selection of advisor
34	(2 3) /Knowledge of Thesis Process/Classified thesis
35	(2 4) /Knowledge of Thesis Process/Thesis database
36	(2 5) /Knowledge of Thesis Process/Topic selection
37	(2 6) /Knowledge of Thesis Process/Student initiative
38	(2 7) /Knowledge of Thesis Process/Funding
39	(2 8) /Knowledge of Thesis Process/Format
40	(3) /Difficulties
41	(3 1) /Difficulties/Cross-departmental
42	(3 4) /Difficulties/Need for collaboration
43	(3 5) /Difficulties/Lack of timeline
44	(3 2) /Difficulties/Lack of conduit for process improvem
45	(3 3) /Difficulties/Thesis quality
46	.Participant
47	.Participant.Faculty
48	.Participant.Stakeholder
49	.Participant.Student
50	.Participant.Faculty:Fac-Aero
51	.Participant.Faculty:Fac-CompInfoProg
52	.Participant.Faculty:Fac-Engr-Physics
53	.Participant.Faculty:Fac-MetocOceano
54	.Participant.Faculty:Fac-NSA
55	.Participant.Faculty:Fac-OR
56	.Participant.Faculty:Fac-SM
57	.Participant.Faculty:Fac-SpaceSys

58 .Participant.Student.2ndQtr
59 .Participant.Student.Thesis
60 .Participant.Student.PhD
61 .Participant.Student.2ndQtr:Aero
62 .Participant.Student.2ndQtr:CompInfoProg
63 .Participant.Student.2ndQtr:EngrPhysics
64 .Participant.Student.2ndQtr:MetocOceano
65 .Participant.Student.2ndQtr:NSA
66 .Participant.Student.2ndQtr:OR
67 .Participant.Student.2ndQtr:SM
68 .Participant.Student.2ndQtr:SpaceSys
69 .Participant.Student.Thesis:Aero
70 .Participant.Student.Thesis:CompInfoProg
71 .Participant.Student.Thesis:EngrPhysics
72 .Participant.Student.Thesis:MetocOceano
73 .Participant.Student.Thesis:NSA
74 .Participant.Student.Thesis:OR
75 .Participant.Student.Thesis:SM
76 .Participant.Student.Thesis:SpaceSys
77 .Participant.Student.PhD:Aero
78 .Participant.Student.PhD:CompInfoProg
79 .Participant.Student.PhD:EngrPhysics
80 .Participant.Student.PhD:MetocOceano
81 .Participant.Student.PhD:NSA
82 .Participant.Student.PhD:OR
83 .Participant.Student.PhD:SM
84 .Participant.Student.PhD:SpaceSys

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APPENDIX G. NVIVO NODE CODING REPORT

The Node Coding Report is a report that NVivo software produces after documents are coded. It allows the researcher to see what themes are emerging from the data. This appendix report was produced from Node 7, under the *sharing* code. The bolded subheadings give the document numbers and titles of the data transcribed by the contract court reporter.

NVivo revision 1.0.118

Project: Thesis I

Date: 8/5/00 - 3:05:37 PM

SHARING REPORT

Created: 7/13/00 - 9:40:17 AM

Modified: 8/1/00 - 2:16:03 PM

Documents in Set: All Documents

Document 1 of 12 FG11t-Faculty

Passage 1 of 10 Section 0, Paras 510 to 511, 57 chars.

SPEAKER 7: Use the Web site for information sharing and organizing.

Passage 2 of 10 Section 0, Paras 520 to 522, 171 chars.

SPEAKER 10: So they are -- they are interested in what we're collecting, because they want to know what people want on the Intranet, and what they want as a Web page for the School.

Passage 3 of 10 Section 0, Paras 812 to 814, 134 chars.

SPEAKER 8: the whole environment in the department is -- I mean, it's education, so hopefully we're sharing information of one sort or another.

Passage 4 of 10 Section 0, Paras 841 to 843, 111 chars.

SPEAKER 9: I don't know that what we have is an informational problem. We share information. We don't share knowledge.

Passage 5 of 10 Section 0, Paras 966 to 968, 116 chars.

SPEAKER 2: That's the reason why I keep harping back to people-to-people. That's the way knowledge is typically transferred.

Passage 6 of 10 Section 0, Paras 986 to 990, 268 chars.

SPEAKER 9: And that's beyond information. That's seems to be knowledge, or that might be something that that predecessor may not want to share with me, because it's value added in for him or her that makes him or her more competitive, and maybe he doesn't want to share it.

Passage 7 of 10 Section 0, Paras 1021 to 1028, 401 chars.

SPEAKER 5: You've got to figure out a bureau -- or an institutional structure or process that encourages me to want to share with AI, that encourages me, that rewards me for -- and provides time and opportunity and reward for me to share with him. Otherwise, I figure I'm better off not trying to master all this technology, and not spending all my time working with a knowledge portal, or anything else.

Passage 8 of 10 Section 0, Paras 1041 to 1043, 157 chars.

SPEAKER 5: But how do you -- how does the institution encourage me and reward me for sitting down with him to doing it? Just creating a knowledge portal won't do it.

Passage 9 of 10 Section 0, Paras 1075 to 1077, 134 chars.

SPEAKER 7: It's -- so I see a lot of sharing as an important part of the intellectual stimulation in the classroom from different disciplines.

Passage 10 of 10 Section 0, Paras 1090 to 1092, 135 chars.

SPEAKER 8: I've watched the students, and they learn from each other. And they -- you know, they share information on how to get information.

Document 2 of 12 FG12t-Faculty

Passage 1 of 1 Section 0, Paras 859 to 869, 549 chars.

SPEAKER 8: I mean, I think it gets to the point of number three, you -- you know, back to information sharing on this campus is the primary -- you know, it's one of the top problems at this School.

SPEAKER 1: It is really.

SPEAKER 8: And it's not so much that we need to go out and get our research done, because we all have a handle on that, but to get people to share their information, like the site licenses, or whatnot, you have to make it easy, and you have to make those people who have that information cough it up.

Document 3 of 12 FG13t-2Qtr

Passage 1 of 1 Section 0, Paras 754 to 756, 107 chars.

SPEAKER 7: And then as far as tools goes, if there was a chat feature on there, that would help information sharing.

Document 4 of 12 FG1t-CurricOs

Passage 1 of 1 Section 0, Paras 739 to 746, 386 chars.

FACILITATOR 1: So in order for any knowledge portal link -- for technology to be successful, you also have to have a culture that embraces that technology. So that's where we're trying to go with this question.

SPEAKER 3: Shift the academic paradigm.

SPEAKER 7: I honestly don't think people are knowledge hoarders. I think in the military it's actually the other way.

Document 5 of 12 FG2t-Thesis

Passage 1 of 3 Section 0, Paras 540 to 543, 206 chars.

SPEAKER 10: Every department they have -- every quarter all the professors present their thesis topics to the group. So everyone knows what every professor is working on and what he's supposed to know.

Passage 2 of 3 Section 0, Paras 586 to 594, 444 chars.

SPEAKER 4: You don't get any of that stuff here. That was a big disconnect for me, you know, coming off the ship where I'm reading tons of message traffic every day, to come in here and you don't find out anything.

SPEAKER 6: It's a different --

SPEAKER 4: You know, there's no tie in.

SPEAKER 6: There to here.

SPEAKER 2: You have to like Email too. Lot of membership by Email here.

Passage 3 of 3 Section 0, Paras 635 to 650, 676 chars.

SPEAKER 6: Biographies?

FACILITATOR 2: Biographies.

SPEAKER 10: Something like a biography thing. You fill out your history --

SPEAKER 6: Some people might not want that out there. To me, that would be stuff I wouldn't want out there, as far as OME.

SPEAKER 10: But you're artillery officer and a badge of --

SPEAKER 6: Or OMOS, yeah, fine, but not your hobbies.

SPEAKER 10: Not talking about who has been {337}¹ on the BDG, or -- that's the type of stuff I'm talking about.

SPEAKER 6: Not part of the CI --

FACILITATOR 2: You don't care what the {338} is; right?

Document 6 of 12 Fg3t-PhD

Passage 1 of 8 Section 0, Paras 695 to 705, 679 chars.

SPEAKER 8: I read something in here about information hoarding and sharing. I don't know if that comes up later, but it struck me as wrong. In the military I've seen more information sharing. In the academic world I've seen more information hoarding. As far as, you know, I'm working on this specific project here, and some other guy's like, hm, that's interesting. You know? But I'm not going to tell you what I'm doing. I'd like to hear all about your work, but I -- in the military it's usually share more so everybody succeeds. I don't know if it's different in different communities, but our success has been based on sharing information, versus hoarding.

Passage 2 of 8 Section 0, Paras 718 to 724, 293 chars.

SPEAKER 1: That's why people tend to publishing before they're ready.

SPEAKER 3: Right.

SPEAKER 1: That's one way to protect yourself. It's part of the culture, I guess, if that's what you're looking for. It's also based on the way the faculty gets paid here.

Passage 3 of 8 Section 0, Paras 744 to 751, 410 chars.

SPEAKER 3: It's different in technical research than what you see over in the NSA Departments, and things like that, maybe that is, because it really is a dollar and cents kind of thing. Once they're published, they're happy to talk to anybody about it, you know, but until that point, if everybody is doing the same thing, you know, there is not going to be a lot of sharing in that regard.

Passage 4 of 8 Section 0, Paras 944 to 947, 186 chars.

SPEAKER 8: But I don't see if there is any -- an Internet relay chat (IRC), I don't see how it would really work here, because it's not -- I don't know -- the urgency isn't there, as far as information transfer.

Passage 5 of 8 Section 0, Paras 948 to 951, 190 chars.

SPEAKER 8: But if you need something from somebody and it's academic, you call them or email them, and that's usually sufficient. So the IRC chat thing is probably not really something you'd need.

¹ {###} signifies an unintelligible recorded segment that could not be deciphered by the court reporter

Passage 6 of 8 Section 0, Paras 1086 to 1093, 430 chars.

FACILITATOR 1: How can you incentivise information sharing? We talked about that a little bit. With greater data availability?

SPEAKER 1: It's a zero sum game. Quite frankly, I'm glad that all the people in this room didn't know about SPAWAR fellowships, because I might not have gotten mine. You know, I'm not sure how you're going to fix that one. You have zero sum dollars they intend to give away, or whatever it was.

Passage 7 of 8 Section 0, Paras 1094 to 1100, 293 chars.

SPEAKER 3: Well, there is incentive for the department chairs to share this information, because to the degree that they get somebody to bite --

SPEAKER 1: Yes.

SPEAKER 3: -- that brings money into their department, and that's good.

FACILITATOR 1: Okay.

Passage 8 of 8 Section 0, Paras 1110 to 1112, 168 chars.

SPEAKER 2: I'd say relax some of the privacy restrictions that were imposed last year. Like [J..] was saying, when all her professors had to go remove their Web site.

Document 7 of 12 FG5t-Faculty

Passage 1 of 17 Section 0, Paras 333 to 339, 400 chars.

SPEAKER 6: One thing we haven't actually mentioned, but a lot of ways that knowledge gets shared is simply because a colleague sees it, knows what you're interested in, and forwards it to you over email that you otherwise would not have seen. I mean, whether they are sending it to everyone or you specifically kind of varies with their orientation and their facility with electronic email.

Passage 2 of 17 Section 0, Paras 340 to 347, 433 chars.

FACILITATOR 1: How do you make your peers aware, or your colleagues aware, of topics that you're interested in?

SPEAKER 6: Well, in some cases it's part of your job. For example, I'm teaching [x course], so one of my colleagues in Newport, who actually heads up this particular course worldwide, sent out copies to everyone of the brand new, December 1999, National Security Strategy Report.

Passage 3 of 17 Section 0, Paras 349 to 350, 105 chars.

SPEAKER 6: But the point here is that there is that person to person interaction, which is very important, I think.

Passage 4 of 17 Section 0, Paras 351 to 355, 250 chars.

SPEAKER 7: I think we're on something here, and that is the importance of a peer network, inside the School and outside the School, for getting information about what's going on is extremely important, and I think email has really unleashed it.

Passage 5 of 17 Section 0, Paras 364 to 365, 97 chars.

SPEAKER 6: So it's not just peers and colleagues, but it's also a teacher-student relationship.

Passage 6 of 17 Section 0, Paras 447 to 448, 86 chars.

SPEAKER 6: There's no central, useful bulletin board that anyone can access and easily put on:

Passage 7 of 17 Section 0, Paras 463 to 467, 248 chars.

FACILITATOR 1: And I will -- just caution you, that the portal can connect to available resources. It can help put people in touch with people. It can move -- a portal can provide a tool. It's a piece of technology. But people have to use that technology.

Passage 8 of 17 Section 0, Paras 591 to 595, 239 chars.

SPEAKER 8: This might be a good focus area for a knowledge portal. If you could better connect faculty knowledge to sponsor needs, that answers a lot of -- you know, all at the same time. You'll definitely have engagement by people.

Passage 9 of 17 Section 0, Paras 958 to 959, 121 chars.

FACILITATOR 1: are there ways that you could suggest to make information sharing more appealing on the campus, so people want to share?

Passage 10 of 17 Section 0, Paras 960 to 961, 24 chars.

SPEAKER 6: if there's an easy way

Passage 11 of 17 Section 0, Para 967, 39 chars.

SPEAKER 8: Say easy to contribute or disseminate.

Passage 12 of 17 Section 0, Paras 969 to 970, 69 chars.

SPEAKER 9: Adding incentives, and reducing the costs of information charges.

Passage 13 of 17 Section 0, Para 973, 31 chars.

SPEAKER 9: Reduce the dissemination costs.

Passage 14 of 17 Section 0, Paras 1190 to 1197, 443 chars.

FACILITATOR 1: Do you feel that this is a knowledge sharing organization, or a knowledge hoarding organization?

SPEAKER 7: We're knowledge sharing, I think everybody would agree, until you get to the uppermost levels of the military administration, at which point DOD is deciding that all members of DOD will be knowledge hoarding organizations. So the top down says hoard; bottom up says share, and in the middle is a clash.

Passage 15 of 17 Section 0, Paras 1227 to 1228, 64 chars.

FACILITATOR 1: Some types of expertise you don't want to share.

Passage 16 of 17 Section 0, Paras 1255 to 1261, 288 chars.

FACILITATOR 1: Is that information currently stored somewhere, the thesis information or the abstract, is it in a central repository?

SPEAKER 1: I think so, yeah.

SPEAKER 6: Where?

SPEAKER 1: The abstracts.

SPEAKER 4: The DTIC Web page.

Passage 17 of 17 Section 0, Paras 1470 to 1474, 217 chars.

SPEAKER 6: People are invited, but you wouldn't necessarily know, because the knowledge portal is not user friendly for sharing that. Okay? But I'm just saying if it were, then you could put that sort of thing on there.

Document 8 of 12 FG6t-2Qtr

Passage 1 of 3 Section 0, Para 129, 556 chars.

SPEAKER 4: So -- and the professors were more than willing to help us out. And I find, even talking to the regular students who are going to be here for six quarters in our curriculum, that they're -- they are finding them the same way. Just go around, ask teachers, you know, for help, because a lot of people -- or some people get sent here by commands to Fleet, a -- for specific reasons, but a lot of people are just sent here, and they don't necessarily have a thesis topic. They're trying to find one. Professors are always -- have something for them to do.

Passage 2 of 3 Section 0, Paras 159 to 165, 417 chars.

FACILITATOR 2: at NPS, are in a knowledge hoarding or a knowledge sharing community? What's your experience? I know you are not here that long, but --

SPEAKER 7: You mean among the students or --

FACILITATOR 2: Sure. Among the students, between students and faculty. What are your impressions?

SPEAKER 6: Sharing.

SPEAKER 5: Sharing.

SPEAKER 6: Sharing, definitely.

Passage 3 of 3 Section 0, Para 167, 62 chars.

FACILITATOR 2: So you're talking of primarily student-to-student?

Document 9 of 12 FG8t-Deans

Passage 1 of 3 Section 0, Paras 636 to 642, 358 chars.

FACILITATOR 1: from a number of other discussions in previous focus groups that one of the concerns is communication and the sharing of information here at NPS. Do you all think there's a problem with that?

SPEAKER 3: It depends on the information you're talking about.

SPEAKER 9: Amen.

SPEAKER 3: Now you are on a difficult topic.

Passage 2 of 3 Section 0, Paras 698 to 700, 156 chars.

SPEAKER 3: So this is this kind of information sharing, which is a true problem, which, however, hopefully, with systems like this, can be alleviated to some extent.

Passage 3 of 3 Section 0, Paras 701 to 705, 335 chars.

SPEAKER 3: It's not always bad intent by the two parties. It is truly, in many cases, any possibility -- or difficulty in getting the information at the right time and the right place, so that an orderly decision making process will take place.

Document 10 of 12 FG9t-Thesis

Passage 1 of 7 Section 0, Paras 267 to 270, 1428 chars.

SPEAKER 6: And my pet peeve is that there is some great work being done in the METOC Department right now. Okay? And they're probably working on a program, okay, that if I, as a financial management, knew about that, they could analyze the scientific aspects of their research, and I could go ahead and analyze the fiscal ramifications of that project from cradle to grave, from the time it goes through R and D to the time it goes through production.

But I don't even know what [D...] is working on. I have no clue what her thesis -- or the people in her department are doing. Neither do they know about what's going on in computer science or National Security Affairs.

I tried to do a thesis that was cross-departmental. I ended up having to stop, because it was in the way-too-hard category. The NSA people couldn't understand why I was trying to interject a financial aspect of that program. And the Systems Management people couldn't understand why I was taking on such a lofty NSA topic.

There's not a lot of cross-pollinization when it comes to the thesis here on campus. But I think the true measure of you being a good graduate student -- which is what we're going to end up having to do when we go to the real world, and we're going to be assigned to integrated project teams, and have to work from diversified backgrounds -- you don't know what the other people are doing.

Passage 2 of 7 Section 0, Paras 277 to 279, 306 chars.

SPEAKER 3: Or just have every department post on-going research.

FACILITATOR 2: On-going research.

SPEAKER 6: Yeah. Looking for a team manager from Systems Management to help us take the financial budgeting aspects of our air foil improvement project at -- in the Aero Department.

Passage 3 of 7 Section 0, Paras 347 to 348, 477 chars.

SPEAKER 4: There's no chain of command in the academic world. They, for lack of a better term, don't think like we do. We don't think like they do. So if you want information sharing, you're going to have to go outside the established channels. How you do it is up to you, but SOFs aren't going to be published, because tenure is at stake, that kind of thing. You're going to have to establish your own student comments, student reviews of courses, however you want to do

Passage 4 of 7 Section 0, Paras 351 to 353, 109 chars.

SPEAKER 6: the whole thing of sharing information.

SPEAKER 4: Very good.

SPEAKER 6: Chat room.

Passage 5 of 7 Section 0, Paras 419 to 423, 378 chars.

FACILITATOR 1: So do the human portals of information -- do they share that information, not only with --

SPEAKER 6: If you come to the mountain.

FACILITATOR 1: Okay.

SPEAKER 6: Correct. And if you're on the right ridge, because they're all separate ridges here. They're not on the same mountain.

SPEAKER 3: Excellent metaphor.

Passage 6 of 7 Section 0, Paras 510 to 512, 180 chars.

SPEAKER 7: I think all the students are ready to share all the information --

SPEAKER 6: Yes.

SPEAKER 7: -- they have. There's just no conduit to do it.

Passage 7 of 7 Section 0, Paras 518 to 520, 276 chars.

FACILITATOR 1: So obstacles to sharing are -- would be your course load. Your course load prevents you from being able to share information.

SPEAKER 6: Right.

FACILITATOR 1: And on the previous page, you needed a conduit, a way to share that information.

Document 11 of 12 Stakeholder

Passage 1 of 13 Section 0, Para 33, 235 chars.

SPEAKER 1: There are different types of knowledge and different levels of sharing: administrative for corporate decision making and knowledge generated to go in the classroom are easily shared whereas protection of intellectual property leads to less sharing.

Passage 2 of 13 Section 0, Para 616, 124 chars.

SPEAKER 2: Students come into sites that tell them about hot sites in OR and how to follow up on them. They share their knowledge with you.

Passage 3 of 13 Section 0, Paras 1471 to 1473, 491 chars.

SPEAKER 3: I wouldn't be a captain today if I hoarded knowledge. Always been a great believer in that, always benefited from knowledge of those around me. To incentivize, do it day by day yourself. People gravitate toward the way you do business. It is the most important question you asked. The most extreme example was my captain when I was a dept head, who talked about an uppity dept head who didn't share information, and the captain forced information sharing in the cruelest way possible.

Passage 4 of 13 Section 0, Para 1475, 65 chars.

SPEAKER 4: You need to read people and learn the triggers [to knowledge sharing].

Passage 5 of 13 Section 0, Para 1482, 40 chars.

SPEAKER 5: We need to facilitate goal concurrence.

Passage 6 of 13 Section 0, Para 1511, 59 chars.

SPEAKER 6: I don't think there is a culture of knowledge hoarding.

Passage 7 of 13 Section 0, Paras 1519 to 1522, 352 chars.

SPEAKER 1: Encourage the institution to share knowledge by creating an honest-to-God budget. I would really like to have a set of budget numbers that I have total confidence in. Create a solid database of School personnel: how many people in what codes. The tendency is not always to share information when it comes from the outside. We may not proactively share information because there are other things to do.

Passage 8 of 13 Section 0, Para 1571, 341 chars.

SPEAKER 7: I scratched my head: It is a real good question. Promotion and tenure process is very competitive and people are looking for ways to differentiate themselves [contributions to KP and knowledge sharing]. It would have to be seen as good work for the promotion and tenure process: change in universities happens one grave at a time [Duderstadt].

Passage 9 of 13 Section 0, Para 1583, 813 chars.

SPEAKER 8: It is a hard question about what the culture is. From a Knowledge point of view, it is a knowledge sharing one. I think there is information hoarding for protection and out of fear. Not providing complete information because if one provides the whole story someone might get mad. I don't view that as a knowledge hoarding. If I know something of value to a number of people and don't share it until I get credit for it, I don't think we do that. I think we are a pretty open knowledge sharing culture. Does knowledge get shared? Not necessarily, because it is hard. The time to input and locate or determine who to share it with is the key. The portal notion is just put it there and others will find it. Then it becomes the cost of the search. The question is how to offer up the tacit knowledge

Passage 10 of 13 Section 0, Paras 1589 to 1591, 382 chars.

SPEAKER 8: Need some sort of recognition for participation. This culture is low on applauding recognition. But people appreciate being recognized. We should close down the place for half-hour of recognition of long service employees. Academics are impressed with someone getting the Noble prize, but there is also some jealousy. This is contrary to the military which are into ceremonies.

Passage 11 of 13 Section 0, Paras 1635 to 1636, 469 chars.

SPEAKER 9: This is not a hoarding culture. We are isolated by organizational structure, not motivated to hoard. Info just doesn't flow as well as it should. We are a sharing culture but it is confined to networks of people. Incentivize ideas: email guidelines (share these things with everyone; form interest groups); improve lines of communication through published email guidelines; identify different interest groups (i.e. newsgroups); identify common research interests.

Passage 12 of 13 Section 0, Para 1638, 464 chars.

SPEAKER 10: Not a problem - there is good information sharing (although there is sometimes information overload which is either personality driven or research driven). Motivation issues to use the KP? Timely, accessible info so I can get things done faster, understand queries, it must be attractive, i.e. like auto email I subscribe to. It is unfortunate that research is going on in various departments and there is no good way to find out. We need better organization to work on large projects - bring SMEs together better.

Passage 13 of 13 Section 0, Para 1755, 196 chars.

SPEAKER 11: Could do with incentivizing without our organization. There has to be trust. Key individuals don't share information because we turn it on them. People need to share internal data with me.

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GLOSSARY

Artificial Intelligence - The effort to develop computer-based systems that can behave like humans, with the ability to learn languages, accomplish physical tasks, use a perceptual apparatus, and emulate human expertise and decision making.

Bayesian probability - Based on the work of Thomas Bayes, an 18th Century English clerk who published work in mathematical probability. His work centered on calculating the probabilistic relationship between multiple variables and determining the extent to which one variable impacts another. Bayes work is a central tenet of modern statistical probability modeling.

Benchmarking - A way of achieving quality by setting strict standards for products, services and other activities, and then measuring performance against those standards

Best Practices - More effective ways to perform a process or sub-process than the original procedure. Often these best practices can be stored in an electronic repository for sharing across the organization and thus become managed knowledge.

Communities of Practice - A loosely defined group, that have no specific name, formal membership or status in an organization yet is characterized by intensive collaboration and sharing in their pursuit of greater understanding and knowledge.

Concept Matching or modeling - Match ideas and look at frequency and relationships of terms to correlate with meaning. Uses Claude Shannon's theory that the less frequently a unit of communications occurs, the more information it conveys.

Data - A set of discrete objective facts about events. It is the lowest level of known facts that are without context or meaning (Davenport and Prusak, 1998).

Data Mining - A marketing strategy when a personal or individualized messages are based upon likely individual preferences. Massive amounts of data are gathered on consumers and then analyzed to locate customers with specific interest or to determine the interest of a specific group of customers. The data can come from a range of sources.

Expert Systems - Knowledge intensive computer program that captures the expertise of a human in limited domains of knowledge.

Explicit Knowledge - Explicit knowledge is codified knowledge that is transferred through education, formulae, theories, patents, manuals, and books.

Groupware - Software that recognizes the significance of groups in offices by providing functions and services that support the collaborative activities of work groups.

Infoglut - The bombardment of information and data that today connected individual receives via TV, the Internet, printed material and other forms of multimedia. Often this leads to too much information available to the individual where it is beyond usefulness.

Information - Organized data or "data with impact and meaning" (NPS, 1999). It is presented in context and organized so that it can be transferred from person to person.

Intranet - A internal network based on World Wide Web technology.

Keyword Search -A procedure used by web search engines that uses code to recognize keywords in webpages.

Knowledge - The comprehension of information with the discovery of something that was not known before.

Knowledge Management - An emerging discipline that stresses a formalized, integrated approach to managing an enterprise's tangible and intangible information assets. Knowledge management is a coordinated attempt to tap the unrealized potential for sharing and reuse that lies in an enterprise's collective consciousness (Gartner Group).

Lexis -Nexis - An subscription electronic resource that contains federal and state case law and relevant new. It also is a news service and business information service that contains

newspapers, news wires, congressional transcripts, TV and radio transcripts, ,magazines, journals and business publications.

Resident Knowledge - The knowledge that resides in the individuals of the organization. It can be explicit or tacit.

Search Engines or Web Search Engines - Powerful software that uses keyword searches or spidering to find information and knowledge on the Internet.

Shannon's Information Theory - Published by Claude Shannon in his Mathematical Theory of Communications (1949). It states that "information" could be treated as a quantifiable value in communications.

Spidering or Spiders - an information gathering process in which a software code goes from resource to resource, usually web sites, and collects information and makes a list of keywords and concepts it finds. These keywords and their locations are then stored in a database on a server that is indexed so that keyword concepts and locations can be retrieved when needed.

Tacit Knowledge (also called Implicit Knowledge) - Personal knowledge based on skills/know-how, experience, intelligence and attitude that exists in an individual's mind.

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